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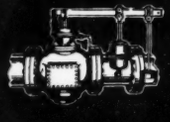

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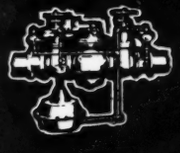

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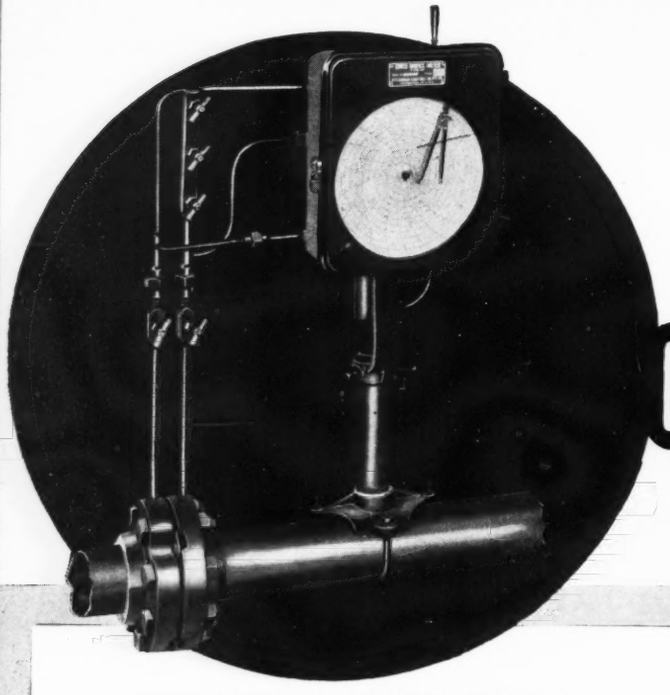
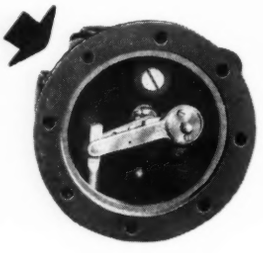


IN MECHANICS, TOO THERE ARE *Symphonies*

TYPE 38 ORIFICE METER

TWO BAR LINKAGE IN DIFFERENTIAL MOVEMENT



The simple requirement of converting the vertical float displacement caused by flow differential to an accurate, equiangular pen motion on the chart has engaged the mechanical ingenuity of measurement engineers for decades. The two bar linkage solution, which has been so successfully used in the EMCO Type 38 Orifice Meter, illustrates the principle that difficult problems usually develop simple solutions.

Not only does this two bar linkage provide exact equiangular displacement of the pen for equal vertical movements of the float, but it does so in a positive friction free manner. The adjustment for differential has been worked into this assembly so that positive recording of differential pressure can be assured.

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Since in the mathematics of gas measurement with the orifice meter the static pressure is of equal importance to the differential pressure, it is necessary to use the best available means to measure and record the static pressure. The time proven long helical pressure coil insures extreme accuracy over its entire working range, with a minimum of fatigue effect. Adjustability, making use of micrometer zero setting, and readily available calibration adjustment is maintained in this assembly. The field man will appreciate the simplicity of assembly and servicing. A separate connecting tube permits replacement of this part, without disturbing the coil proper.

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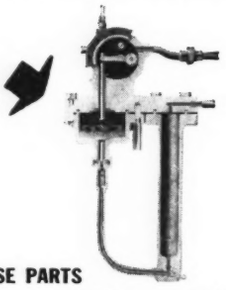
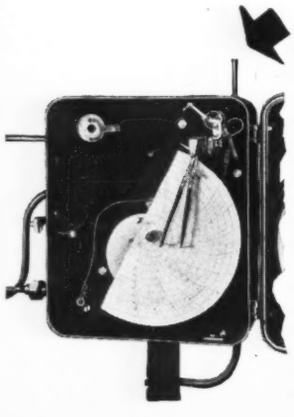


The EMCO Meter incorporates the unique feature of unit manometer construction. The mercury chambers are secured to the flanged bottom of the differential movement housing, constituting a rugged, precision, differential measuring unit for working pressures up to 4000 lbs. per square inch.

Provision is made for converting the manometer range by simply changing the high pressure chamber.

CASE AND CASE PARTS



The case and case parts are outstanding examples of design perfection. The case is sufficiently large so that charts can be changed with ease. All case parts are readily accessible.

The case and cover are aluminum die cast. They are sealed by a moisture-proof sponge rubber door gasket. A quick acting door hasp seals compression as well as permitting opening or closing with one easy motion. A door lock is incorporated in the hasp. Of interest, too, is the location of the two-way level inside the case where it is protected from damage. This level is lined up initially with the differential chamber.

The chart range tag indicates at a glance the proper chart to install at each location. A "quick set" chart retainer which is integral with the chart hub, eliminates the annoyance of the loose type of retainer suspended from a chain. The pen lifter, integral with the chart plate, lifts both pens free without excessive jarring.

THE detailed perfection of the individual parts of the EMCO Type 38 Orifice Meter is blended into a rugged and accurate measuring device. Just as with the great composers, this blending of details is no accident, but the result of careful and studied effort; and as the great symphonies live and give satisfaction throughout the ages—so will a carefully and painstakingly developed mechanism, like the EMCO Orifice Meter, continue to give economical service and satisfaction throughout its long life.

Bulletin 1050 completely describes the EMCO Type 38 Orifice Meter. Write for your copy today.

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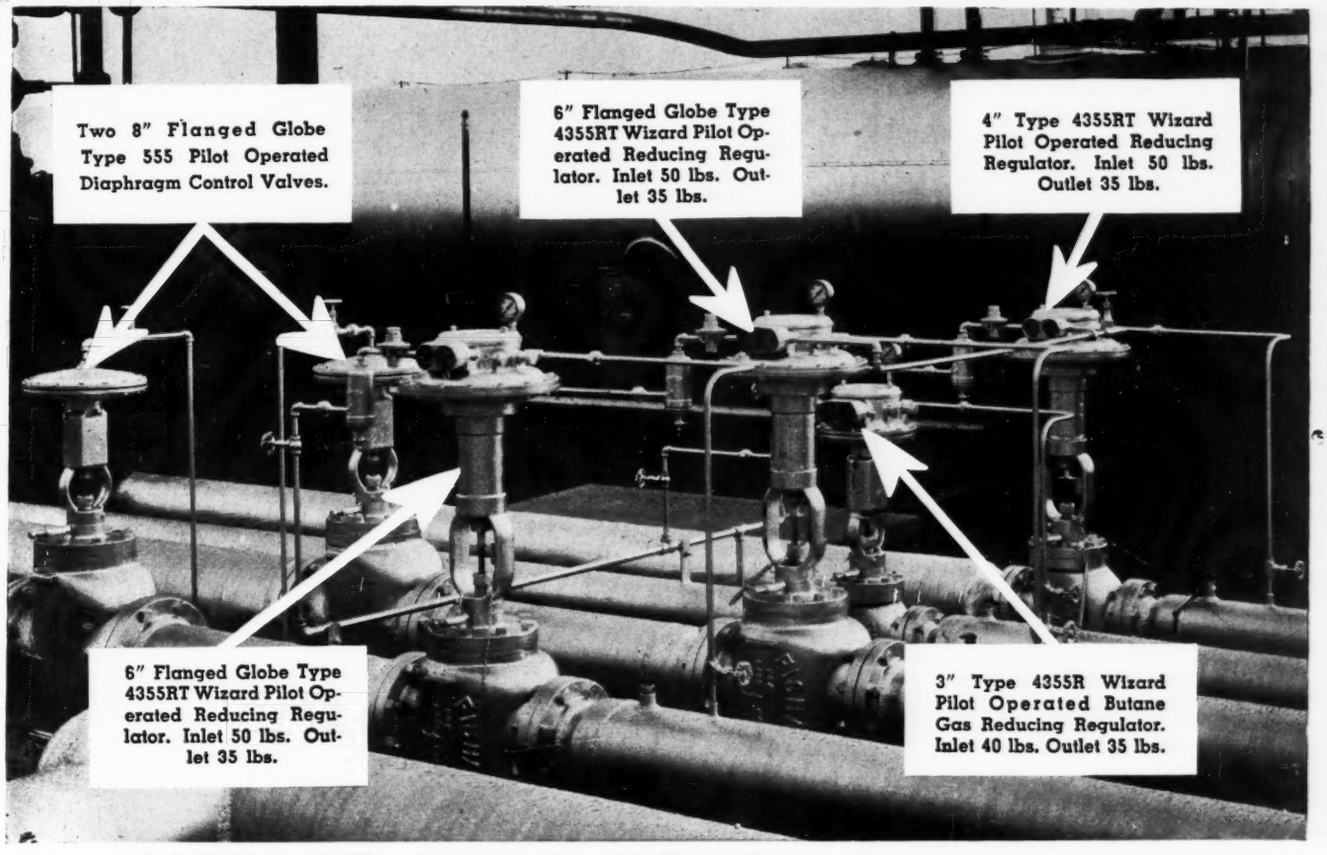
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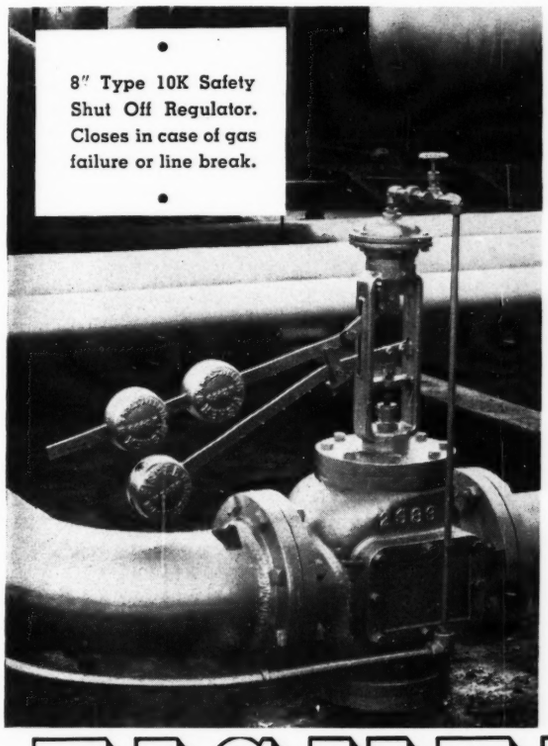

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Seventeenth Year of Publication

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GAS
FEBRUARY, 1941

GUEST Editorial

The Tempo of Industrial and Commercial Gas for 1941

By H. CARL WOLF

President, Atlanta Gas Light Company, Atlanta, Georgia
Chairman, Industrial and Commercial Gas Section, American Gas Association

THE biggest event in the use of gas at the present time is supplying heat for defense production, just as the defense program itself is the biggest event before the country. The gas industry is playing an important part in speeding production in nearly all the plants on which the defense program depends.

The men responsible for production—those who must equip factories, get work through, meet exacting specifications and have finished parts ready when delivery dates roll around—know that their requirements for reliability, reasonable cost and SPEED can be best met in most cases with industrial gas. For a decade the utilization of gas as a tool of industrial production has been put on an increasingly firmer foundation. Steady, effective research; sound advanced engineering, both in equipment and installation; thorough study and understanding of the most modern heating processes—these before the defense program had gotten under way, had convinced production men, from managers to mechanics, that gas is the choice fuel for production operations.

With this background of a 55% increase in the use of industrial and commercial gas in the last decade and with greater efficiency for almost every unit of operation, there is little wonder that dependency in this emergency, with the necessity of meeting schedules that call for speed and more speed, is being placed increasingly in gas and the high grade equipment that has been developed. For years the gas industry has been preparing for this very preparedness program.

Commercial gas sales are assuming increasing importance both in food preparation and in the accelerated national defense program. With changed and changing living conditions, the domestic cooking load has been a source of worry to gas executives. On analysis we find this load being shifted largely to commercial establishments and thus there is a challenge to develop the commercial business to its utmost to offset losses in the domestic load. The aggressive commercial sales practices which are coming into vogue, the eye-appealing, time-saving, economical counter appliances which have been developed by the manufacturers, coupled with the growing recognition of gas as the advisable fuel, are bringing about rapid development in the commercial gas field.

Through sustained advertising in 17 important business and technical magazines; through publicity in over 100 magazines; through personal contacts with leaders in engineering and other fields, the Industrial and Commercial Gas Section of the American Gas Association is placing industrial and commercial gas for normal peace-time uses on a sounder foundation and is preparing to cope with the problems arising from the national defense program.

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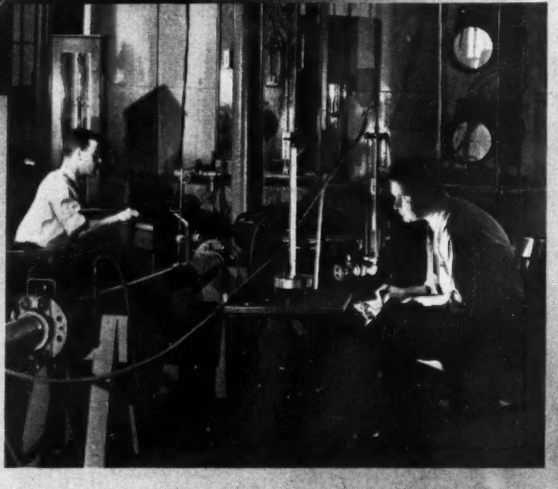

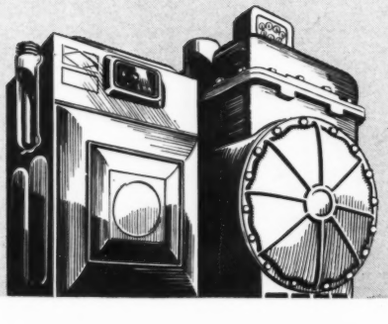

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THERMALLY *Thinking*

Patriotism at a Price

A MATTER of public record that must speedily become a matter of grave concern to the Gas Industry is incorporated in a recent memorandum presented to the National Advisory Commission to the Council of National Defense on behalf of the interests of 22 organizations, ranging from a group of labor unions to the Anthracite Institute, and treating on the "Adverse effect upon the national defense of the construction of new natural gas pipe lines and further replacement of coke ovens by natural gas."

Were it not for the grave nature of the crisis that confronts America, one would be tempted to examine critically the motives of this group of coal interests and their satellites who thus seek to pervert the noble aspirations of national defense to the selfish ends that their traffic in solid fuel be saddled forever on the backs and on the pocketbooks of the millions of consumers who want, and need, and must have made available to them the great resources in natural gas that now lie idle. "Patriotism, sir," said Dr. Samuel Johnson with that unfailing perspicacity that has made his words live over a span of two centuries, "Patriotism, sir, is the last refuge of a scoundrel."

The organizations represented in the memorandum have many of them been fighting for years to back the flowing tide of natural gas, and with varying degrees of success depending in the main on the supineness or the outright venality of the political allies that they have been able to herd into compliant service beneath their banners. As late as October, 1939, the Federal Power Commission refused to cloud its deliberations on pending certificates of public convenience and necessity by considering the contentions of the mine owners and miners, the railroads and the truck drivers that the introduction of a superior fuel would have an adverse effect on their present gainful occupations. The commission ruled, and rightly, that its primary concern was and is to "safeguard the convenience and necessity of the public."

In view of the extensive history of attempted obstruction of this public convenience and necessity, it becomes painfully apparent that the protesting parties have but recently embellished their endeavors with the sword and shield of national defense. None the less, their categorical claims of impending impairment of our defense activities require categorical answers, and it is to be expected that the American Gas Association will forthwith present to the same committee of the National Defense Council a studied refutation of all of the false implications with which the memorandum abounds. Natural gas is too much the central and commanding figure of the gas industry to allow its progress to be arrested by sheer default on the part of its spokesman.

Pending the release of a more detailed rejoinder, however, let us examine briefly the four points made in the coal memorandum to the National Advisory Committee of the Council of National Defense.

Under "Item A" it is stated that 1,250,000 tons of steel will be required to construct the natural gas pipe lines now projected, and that the "stake of this country is too great to gamble with the appropriation of steel products to a use which can at best duplicate existing fuel services." The present capacity of the steel industry, without taking into consideration proposed plant expansions, is approximately 81,000,000 tons a year. The 1940 production of 66,500,000 tons was only about 81% of the industry's capacity. Assuming that all of the 5900 miles of line with which the memorandum treats were to be laid, it would never be accomplished in less than three years. This, then, would show an average requirement of slightly over 400,000 tons a year, or less than one-half of one per cent of the steel industry's total tonnage.

The displacement of solid fuel by natural gas for both domestic and industrial uses would be accompanied by the release of railroad cars, locomotives, and oil tankers (all of which are constructed of steel) for use in the transportation of the implements and impediments of defense that cannot by their nature be transported through simple pipe lines. Quite conceivably the hopeless transportation impasse that necessitated government operation of all of the railroads during the World War may thus be averted in the present effort.

Exhibit B of the memorandum deals in greater length than accuracy with the potential importance of certain by-products of coke oven plants in the Eastern Seaboard area, expressing its gravest concern over the diminution of the potential supply of toluol that might result. The truth of the matter is that the supply of toluol made available as a by-product of coke ovens will depend largely on the demand for coke from the iron and steel industry in

their blast furnace operations. These operations will not be affected by the introduction of natural gas.

As far as the city gas works are concerned, they are no longer the important potential source of tuluol that they were in World War No. 1, and it is highly questionable whether they will be called on to produce any toluol at all. Toluol extraction from the gasoline refining process, unknown in 1917 and only being developed experimentally at the close of the World War, has now assumed such potential proportions that it can easily be called on to outstrip the production of all of the coke plants combined. As is inadvertently disclosed in the memorandum, the War Department has recognized this potential source by awarding contracts involving $11,857,000 for the construction of facilities to produce toluol from petroleum. Whereas in 1917-1918 the Army Ordnance Department had negotiated for the construction of 31 toluol recovery plants at city gas works, not one such plant has been reported contracted for, or even reported as under consideration, today!

In Paragraph C the old and controversial question of oil and gas reserves is trotted wearily around the course. Coal and lignite reserves are said to exist in a supply sufficient to last at the present rate of consumption for at least 3000 years, while "the natural gas supply is presently calculated to last for a little more than 40 years at the current rate of consumption." On file before the Federal Power Commission is the report of a competent geologist who estimates that the gas reserves in the Texas Gulf Coastal area alone amount to approximately 40 trillion cubic feet. This is sufficient to supply 350 million cubic feet a day to the New Jersey, Philadelphia and New York metropolitan areas for the next 319 years. And since none of the fields explored have been completely developed, additional fields can reasonably be anticipated from deeper zones and from the discovery of new sands in the geological column already producing. The history of natural gas reserves over a period of years has been that new discoveries are constantly exceeding withdrawals, and any talk about the dwindling of our natural gas supply must be classified as sheer nonsense.

It is not within our province to discuss the possible effect on the coal, railroad, barge, and truck interests of the introduction of natural gas, as this topic is developed under Heading D of the memorandum. It now appears that natural gas of nearly twice the heating value can be delivered to the gas distributing companies at costs no greater than are presently incurred in the manufacture of low-heat-content manufactured gas. Tremendous increases in gas usage for commercial, industrial, and domestic purposes have in every instance followed hard on the heels of new natural gas pipe line extensions.

Whether the gas industry and its consumers are to be penalized for the unfortunate accident that locates them within the areas regarded by the retail coal trade as their private preserves remains to be decided. The Federal Power Commission has refused to bow to the high-handed demand that public convenience and necessity be made secondary to the economic interests of a small group.

We confidently predict that the ill-fitting garment of patriotism thrown hastily around their protestations will in no way obscure the motives of those who would identify their profits as synonymous with the welfare of our Nation.

Pipe Line Stream Crossings

IN the November, December, and January issues of *GAS* there appeared a series of articles entitled "Pipe Line Stream Crossings." Written by Professor Robert T. Knapp, associate professor of hydraulic engineering at the California Institute of Technology, this series approached the subject from the hydraulic rather than the construction engineer's viewpoint.

The following letter confirms the expressed opinion that Professor Knapp has made a valuable contribution to pipe line engineering:

> Gentlemen:
>
> I have just finished reading the third and last installment of Prof. Knapp's article entitled "Pipe Line Crossings." It is with a great deal of satisfaction that I wish to express my appreciation of the efforts of your magazine in presenting an article such as this. I might add that it is just such engineering articles that persuaded me in the first place to subscribe to your paper.
>
> Now, would it be too much to suggest that you issue a reprint of this article in a simple binding for distribution? I am sure that the nominal cost to you in preparing the same would be justified, and many others, like myself, would subscribe to several copies of the same.
>
> Thanking you for your attention, I am,
>
> Yours truly,
> LELAND J. KEYS
> Stockton, Calif.

Thank you, Mr. Keys, for your letter. It is our thought that other engineers may feel as you do, and might also wish to have reprints of these articles. May we suggest that those interested in receiving such reprints make written request to *GAS*, 1707 West Eighth Street, Los Angeles, Calif.?

In GAS for March

GAS-FIRED SUMMER air conditioning, most important to the industry's future, is each year demanding more of the thought and effort of the industry's engineers and salesmen. While some progress has already been recorded, there is a need for much added information. In the March issue of GAS, therefore, will be published the first of a series of six articles devoted to the description and illustration of the gas-fired summer air-conditioning equipment now being offered by leading manufacturers. The remaining five articles will be published in the April, May, June, July, and August issues of GAS. In addition to describing air-conditioning equipment, this series will present facts and figures which will enable the industry to sell gas-fired summer air conditioning in the face of competition from other fuels. It is the hope of the publishers that this series will become an indispensable aid to the industry's air-conditioning engineers and salesmen.

Gas and the War in England

EACH WEEK, sitting in the safety and seclusion of our editorial office far from Europe's devastating strife, we are much interested to receive and to read the British publication, "The Gas Times," which is published weekly by Hallows & Slaughter, Ltd., at 29 Grove Road, Leighton Buzzard. From several of these issues we have taken the liberty of reprinting on these pages random excerpts which give some insight into the part the gas industry in England is playing in fighting World War II.—Editor.

METHODS by which the gas services in the London region have been maintained in spite of air raids were described at a conference held at the London Gas Centre on 13th December, when Sir Warren Fisher, Special Commissioner of the London Defence Region, paid a visit of inspection.

Describing the magnitude of the task, R. W. Foot, chairman of the centre, pointed out that in the London region over 14,000 miles of mains were needed to carry gas from 52 works through more than 3,000,000 meters to houses and factories.

Explaining the repair system, Mr. Foot said that the various gas undertakings were linked in a grid. The 15 companies enbraced in the scheme dealt with damage within premises. The gas centre came into the picture when damage affected the supply in any area.

When a main was fractured by a bomb the local company sent out its repairing staff. If aid was required to restore the supply this was immediately given by other companies in the area, and by an interlocking arrangement the area could be supplied with gas through alternative mains.

Mr. Foot acknowledged that there were thousands of cases where gas could not be supplied during the first few days of the intensive air attack, but he added that now the companies were ready for anything that could happen.

More than 99.75% of all the people using gas in the London region now had their proper gas supply despite the continual air bombardment.

Sir Walter Fisher paid his tribute to the fashion in which the companies had coped with the difficulties which had beset them since September. He thought that the public should know that in the intervening weeks 23 London gasmen had been killed and 84 injured while at their work.—*The Gas Times*, Dec. 28, 1940.

Gas Buses at Wallasey

FOR many years H. B. Holliday, engineer and manager, Wallasey Gas Department, has had great faith in the possibilities of high pressure gas as a motor fuel. Had it not been for the war, however, his research might not have gone much beyond the purely experimental stage.

Several years before the war one, of the Wallasey Corporation double decker buses was equipped with gas cylinders and some experimental running was undertaken.

Overnight, as it were, the position changed when war started. Relaxation of weight limitations in regard to gas equipment was an early concession and that of course brought the gas bus direct from the experimental stage into the range of immediate practicability.

It was soon difficult and then almost impossible to obtain normal high pressure cylinders, but a special marine cylinder was discovered that could be adapted; these cylinders weighed about 9 cwt. and were 7 ft. 10 in. over-all, and about 21 in. diameter. The capacity of 2100 cu. ft. of gas at 1800 lb. to the sq. in. is equivalent to approximately 8¼ gals. of petrol.

The front staircase of the bus was removed to make room for the cylinder to stand upright in the staircase well, thus loss of seat capacity—an important point to the transport manager—was avoided, while for stability purposes an extra 350 cu. ft. storage cylinder was installed on the chassis nearside to counterbalance the excess weight on the offside. The bus shortly took to the road and soon fulfilled the quiet confidence its sponsors had in it.

A bus loaded with 2100 cu. ft. of gas can operate in a 30-35 mile range. This particular vehicle operates on a service seven miles long, so rather more than two round trips are possible on a single filling. As it is not possible when charging high pressure cylinders to register the quantity of gas put in, the initial and final pressures are noted, and a formula, based on the petrol miles per gallon of the bus and its mileage, gives the consumption in cubic feet without delay.

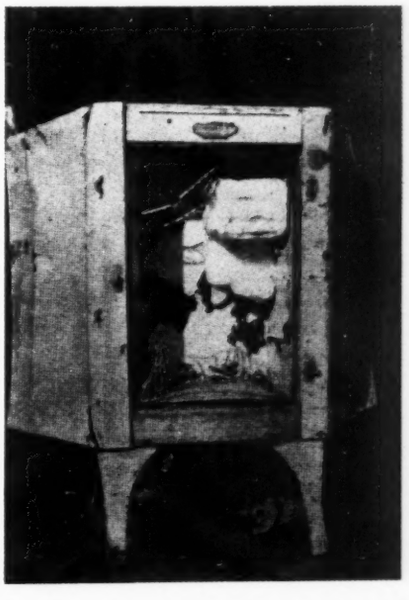
So far this year nearly 7000 miles of actual service have been worked on the original pressure gas petrol engined conversion in Wallasey. Three other buses, for use at peak periods, have already been equipped. Many more conversions would be made if the necessary material were available.

How does the use of gas for bus operation compare with petrol? Gas comes out well on top. Wallasey Gas Department charges compressed gas to the transport department at 3*s.* per 1000 cu. ft., which compares with 1*s.* 3*d.* per gal. for petrol. And with gas there are no additional running or maintenance expenses. Slight reduction in performance is easily offset by the other advantages, and this reduction in performance may not always be with us.—*The Gas Times*, Dec. 7, 1940.

Gas Appliances Can Take It

GAS appliances can certainly "take it." Here is another example which we have received from S. S. Sherlock, sales and repairs manager, Electrolux, Limited; it refers to a refrigerator in

This refrigerator was bombed and buried, but look at the ice!



a south-eastern county and the local gas company reported as follows:

"This bungalow was recently razed to the ground by an H. E. bomb, and no furniture of any kind beyond a skin rug appeared to be left.

"Some days afterwards the L.22 was seen beneath the debris some 20 yards from where it used to stand, with the door missing and the side casings blown adrift. It was thrown into a lorry and brought in for scrap.

"Some enterprising employee placed a piece of asbestos over the door space and lit the burner, when it was found that the freezing unit still operated satisfactorily. The trays and surroundings are now ice."—*The Gas Times*, Dec. 7, 1940.

Gasholders in Air Raids

SPLINTERS from a bomb or missiles caused through a bomb explosion have been hurled at and through a gas holder crown and side sheets, causing gas to escape which became ignited. It was possible, where the hole was not too big, to plug same with wood stoppers and in other cases to cover over with asbestos pads, etc., and patch, but where the hole was too big for a temporary remedy, the gas escaped until the holder level was reduced sufficiently to seal the leak, after which repairs of a permanent nature were made, either by welding or patching.

I would mention also the experience of one undertaking somewhere in Britain, where a gasholder received a direct hit. The incendiary bomb on contact with the holder, which was two thirds filled, burst the side sheets and ignited the gas; two high explosive bombs following penetrated the same lift, burst through the tank plates and exploded in the raft, causing a large hole in the tank; the effect of this was to release the water.

The people in charge, however, with the help of the fire brigade and mobile pumps, averted the danger, and I cite this as an extremely bad case of bombing to show how, with immediate attention and quick thinking, the worst of dangers can be averted.

In general, so far, it has been proved that the gasholders commonly used in this country are extremely free from danger even under the very abnormal conditions to which they are presently being subjected.

Having dealt briefly with gasholders it is best to consider now damage on the district of a more general nature. In this sphere, organization is absolutely vital, men must be stationed at various posts, transport facilities must be arranged and stores of materials such as pipes, connections, etc., must be suitably cached, a record of all connections must be maintained and kept up to date. It is also necessary to keep in touch with responsible A. R. P. officials and insure that everything is being done to make things harmonious and smooth working.

Gas pipes do not suffer alone but nearby waterpipes and electric cables are also damaged; this means that gas instead of escaping may be sealed off by water and, if by any chance electric cables have also been damaged, the danger is further increased due to electrical activity since water is a conductor.

Gum boots are therefore an absolute necessity; it is well to note this, since many people hold that rubber boots are uncomfortable to work in and that where digging is necessary they are a hindrance.

The presence of water is a further danger; due to flooding, mains may become water logged and, of course, the water flows to the lowest part of the system, so that the gas supply over a large area can be completely cut off. The first step, of course, is to ensure that the water mains are cut off and repair of same commenced, but this may not be possible if the gas main is lower or in such a position that it can only be repaired if done before any obstructions are put in the way.

Once the water is shut off the gas system must be pumped dry, and here it may be necessary to get assistance from the auxiliary fire service, as mobile pump units fixed to stand pipes can do the job much quicker. Here again, districts liable to flooding should be prepared beforehand by fixing suitable connections with adaptors to syphons.

It has also been shown that where both gas and water mains have been damaged care must be exercised before making a permanent job to ensure that all silt, etc., due to flooding is removed from the gas mains. One instance is noted where 50 consumers were cut off completely due to subsoil, etc., being washed forward and services completely choked.

Much expense can be caused to the gas undertaking if burst water mains are not promptly turned off. One might visualize the case of houses situated in a valley, where both gas and water mains were burst and the entire gas system flooded; you would then have your meters, fittings, etc., waterlogged and subjected to a very big increase in pressure and, if the head of water was anyway high, meters, compo connections and fittings generally would be completely ruined and extensive damage caused to private property.

It has been shown that it is not always possible where breakage has occurred to cut off the escaping gas by means of A.R.P. stoppers. In some cases the irregularity of the fracture does not permit of those being used. In one instance it was found necessary to first reduce the pressure on the district to a minimum of ten tenths; the broken main was then stopped up with sacking followed by moist clay to a depth of two feet, the flames being extinguished by water from a fire hose.

Excavating for Bag Holes

Excavations for bagging off holes were then made some distance from the crater, bag holes bored and bags inserted, after which the pressure was restored to normal. In the South some undertakings have found it most convenient to brick round certain bagging off holes and leave a cover plate; by this means easy access is assured without the necessary excavation.

Other instances are reported where bomb craters had purposely to be flooded in order to cut off escaping gas; this, of course, was with large mains. The many instances which have occurred are extremely varied and all help to emphasize the need of suitable connections and equipment, the maintenance of suitable transport, the value of messengers, especially where telephone communications have been disturbed.—D. L. Dickson, *The Gas Times*, Dec. 14, 1940.

Overhauling of Valves

THE panel committee has urged all firms to overhaul at once their gas main valves to ensure that in the event of damage, gas could be cut off without delay. In this connection it had been noted that many firms in this district had found their main cocks in a condition, through disuse, which made it impossible for them to be operated at all. He could not too greatly stress the importance of this.

Recently an important factory had been seriously damaged as the result of a lucky hit on a gas main which resulted in a large conflagration. This formed an excellent beacon for aircraft when the enemy returned to renew his attack and had it been possible to cut off the gas supply to this flaming mass in a reasonable time—a question of minutes—the further damage which occurred would have been avoided.—*The Gas Times*, Oct. 26, 1940.

L. P. - Gas Sales Up 33% in 1940

FOR THE PAST several years G. G. Oberfell, vice president of the Phillips Petroleum Co., Bartlesville, Okla., has made an annual survey of the Liquefied Petroleum Gas Industry. Mr. Oberfell's survey for the year 1940 reveals that the potential supply of liquefied petroleum gases is 33 times the present domestic demand for these fuels. This fact alone indicates the great potential growth which lies ahead for the Liquefied Petroleum Gas Industry.

Mr. Oberfell's article was published in the February, 1941, issue of BUTANE-PROPANE News. Excerpts from this article are presented herewith.—(Abstract by GAS.)

THE liquefied petroleum gas industry continued its march of progress in 1940. The estimated marketed production of liquefied petroleum gas during 1940 was 300,000,000 gals. as compared to 223,580,000 gals. marketed in 1939, an increase of 32.5%. Highly specialized sales efforts in the domestic field, increased industrial activities resulting from generally better business conditions, and, to a minor extent, the National Defense Program, accounted for much of this substantial gain.

The progress of the liquefied petroleum gas industry during the past year as well as during the last several years has been in itself very gratifying, but from the viewpoint of the petroleum industry as a whole it is important to note that the volumes of propane and butane marketed as such are only a relatively minor portion of the total supply and a small part of the amount used in motor fuel. About 3% of the total potentially available propane-butane supply is sold as liquefied gas; and this amount is less than 10% of the volumes of these gases used in the production of gasoline by blending or through various polymerization processes.

1940 Estimate

The estimate for 1940 consumption of liquefied petroleum gas for home uses amounts to 128,000,000 gals., which is an increase of 46.3% over the previous year. On the basis of the best information available, the number of new home users of liquefied petroleum gas increased approximately 325,000 during the year, the largest increase secured in any year. Territories where buried or underground systems are more commonly used account for about 50,000 of these new customers, a larger portion being acquired by distributors employing above ground or replaceable cylinder systems.

This year's record is important in another respect also since it is the year in which the number of retail customers passed the million mark, the estimated total now being 1,125,000. Greater public acceptance of liquefied petroleum gas as a domestic fuel due to improvements in economy, efficiency, variety and convenience of gas consuming appliances, increased sales efforts, a larger number of distributors and larger advertising expenditures have been important influences in expanding home use of these highly efficient fuels. In many sections of the south and southwest where distribution is from nearby manufacturing centers, the number of rural and suburban homes completely equipped with liquefied petroleum gas for cooking, water heating, refrigeration and house heating is showing rapid development. In many sections of the country, the competition of electricity for cooking has been reduced materially. Electricity remains, however, the chief competitor of the liquefied petroleum gas industry in the home for cooking, refrigeration, and, to a lesser extent, for automatic hot water heating.

The use of butane and propane by the gas industry in small city gas plants and in certain other applications in larger gas manufacturing plants continued to show some increase as indicated by the 23.5% gain over the 15,435,000 gallons used in 1939 to an estimated 19,000,000 gallons in 1940. The merchandising of liquefied petroleum gas by utility companies beyond their gas mains has shown no developments worthy of comment. It appears that existing liquefied petroleum gas distributors are doing an excellent job of handling this type of market, particularly in the metropolitan and suburban areas around the larger cities.

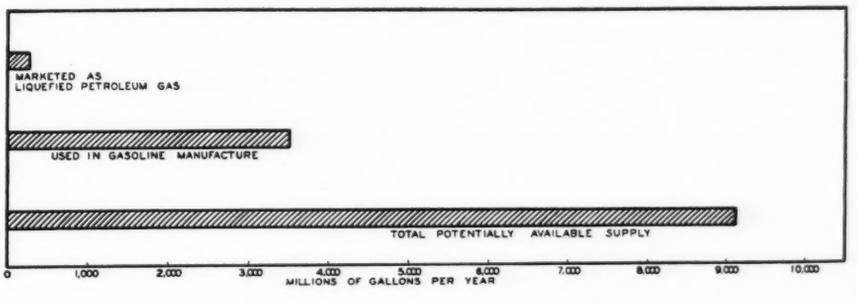
The use of butane and propane as natural gas substitutes during peak demands continues to be of increasing interest to the utility gas industry and it is expected that substantial volumes will be required for this purpose during the present winter months. The use of propane and butane by utility companies to meet peak-load gas demands has shown that many economic and operating advantages can be gained by such methods of producing standby gas.

The industry continues to enjoy a fine record of safe practices in the storage and distribution of its products. The latest safety standards by the National Board of Fire Underwriters and published in July, 1940, incorporate all of the various standards formerly published separately. The following states have part or all of the National Board of Fire Underwriters' standards in their liquefied petroleum gas safety codes: Minnesota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Arkansas, Alabama, Louisiana, Mississippi, Kentucky, Tennessee, Ohio, Michigan, Indiana and New Mexico, with California now considering revisions of its existing safety code.

Transportation Regulations

The Interstate Commerce Commission is placing in effect January 7, 1941, revised regulations for the transportation of hazardous commodities in which are included for the first time specifications for the construction of fusion-welded high pressure tank car shells.

Continued success and progress in the future can be assured by proper attention to economics, by aggressive merchandising and by careful observance for established safety standards.



DEMAND FOR BUTANE & PROPANE IN LIQUEFIED PETROLEUM GAS INDUSTRY AND IN MANUFACTURE OF GASOLINE AS COMPARED TO POTENTIAL SUPPLY

Gas Conservation In Oklahoma

SINCE its first oil and gas conservation laws were passed in 1915, Oklahoma has made steady progress in preventing unnecessary waste of these valuable natural resources.

Prior to 1915 many billions of cubic feet of natural gas were wasted annually. Natural gas was allowed to roar into the air from newly finished wells with little or no restraint. The chief objective of many operators was to produce oil as rapidly as possible. Because markets for gas had not been fully developed, little thought was given to the profligate waste of this most valuable natural resource.

Huge gas flares illuminated the nights in many fields. Often natural gas was sold on a flat rate basis and consumers permitted it to burn in their homes and store 24 hours per day. When gas was discovered in commercial quantities in connection with a producing oil well the gas not utilized in lifting the oil often was permitted to escape from gas-bearing sands in prodigious quantities.

This was not necessarily criminal waste. Because of limited uses and markets for natural gas in the then very new state of Oklahoma, the full value of this product as a natural resource was not fully appreciated.

Many gas men, during the period from 1887 to 1915 when waste of natural gas in the Mid-continent area, including Kansas and Oklahoma, was most prevalent, did not realize that the wells in that area could be so rapidly depleted. Ross M. Stuntz, of Electric Adviser, Inc., 60 Wall Tower, New York, in a paper on, "Some Natural Gas History" read before the Gas Division meeting of the Oklahoma Utilities Association at Oklahoma City, Okla., September 25, 1940, pointed out that gas wells in the East generally had high rock pressures but were small in volume. The producing sands, he explained, were thick and very fine grained which only allowed the gas to be produced slowly. The producing life of these wells varied up to 30 years.

"At that time," said Mr. Stuntz, "there was no experience to warn them of the rapid decline that would take place in the volumes and rock pressures of these Mid-continent wells, and to make matters still worse, other industrial uses for enormous amounts of gas developed locally near these larger gas fields. It is certain that these local industries, attracted to the vicinity of these gas fields, used more gas from them than was ever used by all the pipe lines constructed primarily to serve the public. These industries consisted mostly of brick, glass and cement plants, and zinc smelters."

Mr. Stuntz cited as an outstanding example, the rapid depletion of the Hogshooter field of Oklahoma. "Although at times its total open flow was

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considerably in excess of 2,000,000 M c. f., local markets like the smelters at Collinsville and Bartlesville, took out the gas rapidly, and the larger lines with their pump stations hustled the depletion of that field along rapidly. Wells discovered late in 1906, or early in 1907, and having open flows of over 50,000 M c. f. each and rock pressures of around 700 lbs., had declined to 250 lbs. by 1912. By 1915 that field was no longer a major factor in the natural gas business."

The first Oklahoma oil and gas conservation statutes were very complete and quite fully covered the ground so far as was possible at that time. The Oklahoma Corporation Commission organized an oil and gas conservation department and in 1917 adopted rules and regulations for the conservation of oil and gas. These were amended in 1922 to require drilling operators to give a $2500 bond to guarantee that any well, upon abandonment, would be plugged in accordance to the rules and regulations of the commission.

In 1933 the conservation laws were revised and a proration system and enforcement staff were provided. Again in 1935 the conservation laws were amended to permit spacing of oil wells in the common sources of oil supply in such a manner as to prevent waste. Since gas is almost always encountered in greater or lesser quantities in connection with successful drilling for oil, the spacing regulation also was applied to gas wells.

As a result of these statutes and expansion of the work and effectiveness of the oil and ga conservation department of the Oklahoma Corporation Commission, there is now little waste of these irreplacable natural resources, William J. Armstrong, conservation officer of the commission, believes.

Under the well spacing statutes the corporation commission, upon its own initiative or upon petition from operators, may establish drilling units of specified sizes and shapes. These drilling units may not exceed 10 acres, unless 80% or more of the lessees owning at least 80% of all the acreage embraced within a probable producing area of the common source of supply agree to a larger unit. This, in no case, can exceed 40 acres unless agreed to by all operators in the field.

Proper well spacing permits the operators to obtain the greatest ultimate recovery of oil or gas with the largest possible profits to stockholders and royalty owners. Figures in the conservation department show that increasing the well spacing is at all times a great conservation measure. Experience in the old and new Burbank (Okla.) fields is cited.

In the old Burbank field, drilled in on a 10-acre basis, 900 unnecessary wells were drilled costing approximately $29,000,000. In the South Burbank field, where almost identical conditions exist, 20-acres spacing was employed. The greater spacing saved the drilling of 200 unnecessary wells accomplishing a saving of approximately $5,000,000, the conservation department figures.

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In the latter field the residue gas was returned to the ground so as to maintain the pressure, and the lifting cost was materially reduced. In spite of the wider spacing in that field, it is indicated that the ultimate recovery will be greater than in the old Burbank field.

"By additional application of pressure maintenance methods, wider spacing of wells can be justified in the future with enormous savings in drilling, developing and operating costs," Mr. Armstrong pointed out.

The heart of the Oklahoma oil and gas conservation laws is the prevention of waste of these products. The law specifically stipulates that these products shall not be produced "in such a manner as to constitute waste."

It is "waste" under the Oklahoma statutes to permit natural gas to escape in commercial quantities into the open air, to permit drowning of a gas stratum or to allow a gas well to produce from different sands at the same time through the same string of casing.

If the production from any common source of natural gas supply is in excess of market demands, then any operator may take from the common source only such portion of gas as may be marketed without waste, as his production may bear to the total natural flow of the common source of supply. Gas companies are required to measure open flow potentials of each of their wells every six months and make monthly reports to the Corporation Commission on purchases of dry gas. They are limited to the production of 25% of this potential flow in each well.

Purchasers and sellers of natural gas are prohibited from discriminating against any producer in a common source of supply reached by their pipe lines, and must purchase the gas on a ratable basis.

When gas, upon being found, is not needed for immediate use, it must be confined to its original stratum until it can be produced and utilized without waste.

During the early 1930's when the great Oklahoma City oil and gas field was brought in, scarcely a day passed during the peak of new production, when at least one great gusher did not spout hundreds of feet into the air, the roaring force of the high-pressure gas often audible for miles. One of these gushers spouted and sprayed precious "liquid gold" over sections of Oklahoma City and as far south as Norman, 20 miles distant, and was out of control for days. Others caught fire and sent huge columns of flame and smoke high into the air, illuminating the landscape for miles about, melting down derricks and defying for days the best efforts of experienced oil field firefighters to extinguish the flames.

Since those days the oil and gas industries have developed scientific methods of bringing in wells under pressure with perfect control. Gushers which waste prodigious quantities of oil and gas now are all but unknown in the Oklahoma fields, the Corporation Commission reports. "We do not consider gas necessarily used in the production of oil as wasted," said Mr. Armstrong. "Gas thus utilized performs a necessary and useful function. We feel that we have largely stopped the waste of commercially valuable natural gas in Oklahoma."

Natural Gas Takes Upward Trend in 1939

THE marketed production of natural gas renewed its upward trend in 1939 after the slight setback recorded in 1938, according to a report of the Bureau of Mines, United States Department of the Interior, prepared under the supervision of G. R. Hopkins, Assistant Chief Economist, Petroleum Economics Division. The total production in 1939 was 2,476,756,000,000 cu. ft., an increase of 8% over the 1938 total and 3% over the 1937 peak. The report was released January 28.

Consumption of natural gas (marketed production less net exports) also increased 8% in 1939, amounting to 2,473,765,000,000 cu. ft. compared with 2,294,097,000,000 cu. ft. in 1938. With the exception of fuel used at petroleum refineries, all the major classes of consumption increased over the 1938 figures.

The value of natural gas at the wells was 4.9 cents, the same as in 1938. The average value at points of consumption declined 0.2 cents to 21.6 cents. The average price for domestic and commercial consumption was 67.9 cents compared to 68.3 cents in 1938. The average value of industrial gas other than field and carbon black declined 0.2 cents to 16.6 cents in 1939.

The value of gas used in oil and gas fields declined, even though the amount increased. This was due to a material gain in the consumption of the lower priced gas in Texas.

Consumption of natural gas, 2,473,765,000,000 cu. ft., was divided as follows: field use, 680,884,000,000 cu. ft. (27%); domestic, 391,153,000,000 cu. ft. (16%); commercial, 118,334,000,000 cu. ft. (5%); carbon-black manufacture, 347,270,000,000 cu. ft. (14%); fuel in electric public-utility power plants, 191,131,000,000 cu. ft. (8%); fuel in petroleum refineries, 97,685,000,000 cu. ft. (4%); and other industrial uses, 647,308,000,000 cu. ft. (26%). These figures show increases in all major classes of consumption except fuel at petroleum refineries which was 11% less than in 1938.

The number of domestic and commercial consumers totaled 9,602,850, an increase of 338,190 over the revised figure of 9,264,660 in 1938. The average amount of gas used per consumer in 1939 was 53,056 cu. ft. compared to 52,033 cu. ft. in 1938.

There were 58,113,000,000 cu. ft. of natural gas mixed with manufactured gas for distribution in 1939 compared with 55,825,000,000 in 1938.

Interstate and export movements of natural gas expanded in 1939 when 689,795,000,000 cu. ft. were transported, an increase of 8% over the 1938 figure. Exports to Mexico increased from 1,743,000,000 cu. ft. in 1938 to 3,046,000,000 in 1939. Exports to Canada were 76,000,000 cu. ft., 1,000,000 less than in 1938. Imports from Canada ceased entirely during the year.

There were 2,145 gas wells drilled during 1939 compared with 2,236 drilled in 1938.

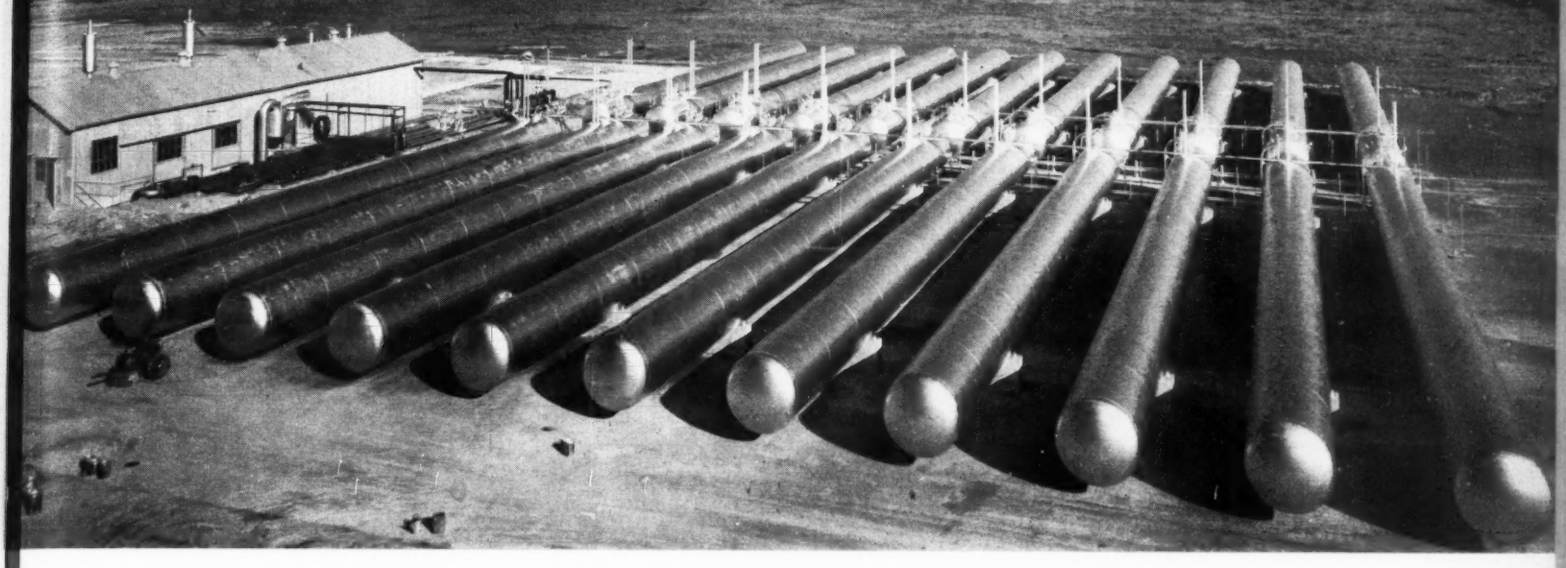
■ ■

New Dry Gas Field Located Near Vernalis, Calif.

With the drilling of an exploratory well by the Standard Oil Co. of California at Vernalis, Calif., a new dry gas field is in prospect.

The well was drilled to a depth of 3782 ft. in a new field about 20 miles south of Stockton, Calif., and 14 miles west of Modesto. Company officials confined their comments to saying the test showed that it indicated commercial possibilities. Additional wells will be drilled on the 8500 acres controlled by the company in the hope of developing its fourth gas field in the central California area to add to the Rio Vista, McDonald Island and Tracy fields. Connections for the new wells can be made with the pipe line of Pacific Gas & Electric Co.'s Buttonwillow-Stockton line.

STANDBY PLANT At Long Beach, California



Part I: Why the City Gas Department Chose A Liquefied Petroleum Gas Air-Mix Plant

By E. S. BRYANT

Assistant Superintendent for the Gas Department, City of Long Beach, Calif.

AFTER many weeks of preliminary study and reports, the City Council of the City of Long Beach, Calif., authorized, on August 24, 1940, a contract for the furnishing, erecting and testing of a liquefied petroleum gas-air mix plant with a peak capacity of not less than 500,000 cu. ft. per hour of equivalent 1070 B.t.u. natural gas, the plant not to exceed a total of $240,000 complete. This picture of a liquefied petroleum gas standby plant built by a natural gas utility serving a community surrounded by producing oil fields is one which might at first observation appear out of focus, and this article is intended to clarify the situation by giving in some detail the background of the Long Beach Municipal Gas Department and the city which it serves.

Population Served: According to the 1940 United States census, the City of Long Beach has a population of 164,721 permanent residents. In addition, however, there are some 20,000 to 30,000 transients living in Long Beach but listed as residing elsewhere. If we consider the 54,822 active domestic meters on the gas distribution system as a basis for estimating the entire population served on a ratio of 3.6 persons per meter, then the Gas Department at the present time is providing service to not less than 197,000 persons.

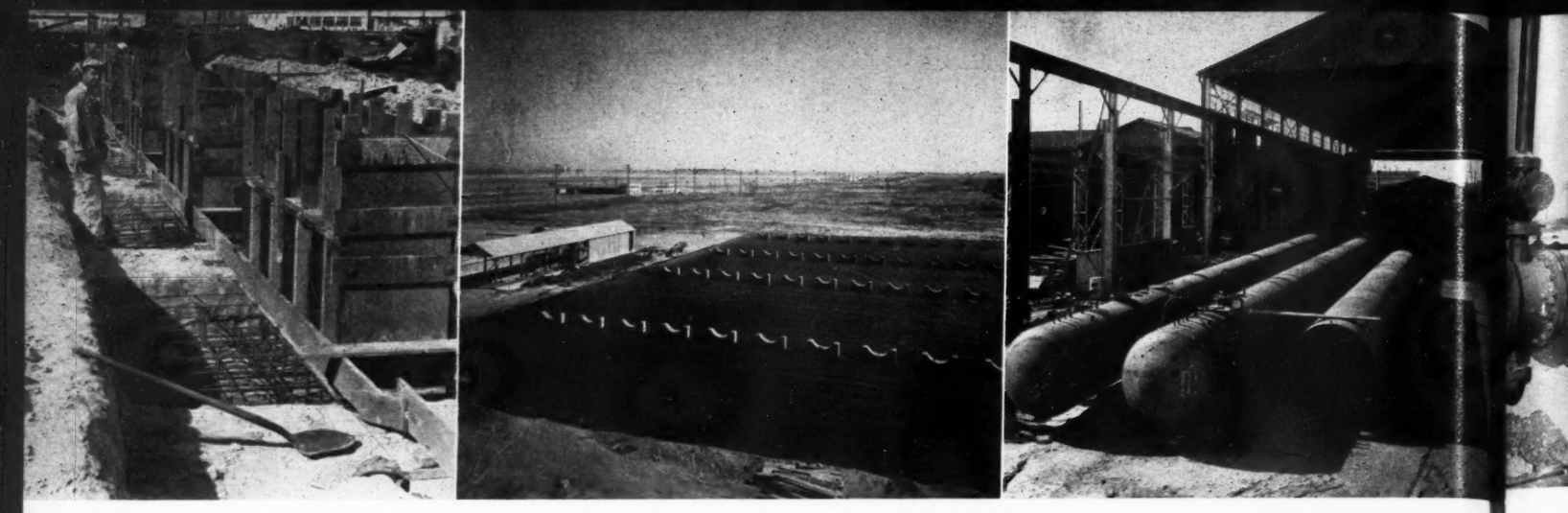
Location and Gas Supply: The City is located 22 miles south of Los Angeles, and borders on the Pacific Ocean. To the west, north and east are located some of the most prolific oil and gas fields in the Los Angeles basin, and a large number of oil and gas wells are not only within the City limits of Long Beach, but many are located on City-owned lands and the City's income from oil has, at times, exceeded $6000 per day. Among the producing fields discovered in this area are the Long Beach oil field (1921); the Seal Beach oil field (1926); the Wilmington field (1936). At this time nearly 100 producing wells are located on City property or on leases in which City has a controlling interest.

The City is also ideally located with respect to the other fields in the Los Angeles basin. Situated amid so many sources of supply, it would appear that the City should have no fear of a natural gas shortage. However, these basin fields are equally desirable as sources of supply to the privately owned gas utilities which serve the City of Los Angeles and all communities in Southern California. As a result, the gas from most of the field is under contract to these utilities, which contracts provide that the gas companies shall have first call on the total available gas production.

Due to these contracts, the City has been unable, except during periods of flush production, to secure adequate gas supplies direct from the fields to meet the peak demands.

Start of Municipal Ownership: In 1922, at the beginning of the oil excitement in Signal Hill, the City, being the owner of several large tracts of land in the heart of the proven areas, leased certain properties for oil and gas development, retaining, however, the right to accept in kind all gas produced over that required for field purposes; the idea being that, should the City at any future time desire to go into the gas utility business, it would have its own gas supplies as a foundation.

Largest and most valuable of these properties, was the A. T. Jergins Trust Lease. This 140-acre tract of land was



LEFT: View showing construction of concrete piers. CENTER: Tank site showing completed piers and McAdams paving. RIGHT: View of tanks being constructed and tested in tank shop at Southwestern Engineering Co.

carefully developed and, at one time, over 16,000,000 cu. ft. of dry natural gas per day, which came from City-owned lands, was being delivered into the gas distribution systems by a privately-owned gas utility which served the City and other communities adjacent to Long Beach.

The plan for a municipally-owned and operated gas utility grew out of the belief that the natural gas produced on City-owned land should be delivered to the inhabitants of the City at a lower cost by a Municipal Gas Department. At an election held in August, 1933, bonds amounting to $3,000,000 were voted, and the privately owned gas properties were acquired by the city in April, 1924.

Value of the original properties, on June 30, 1924, was $3,021,250, against which stood the bonded indebtedness of $3,000,000. On November 30, 1940, the physical properties show a cost value of $6,634,267.62, and the bonded indebtedness was $2,834,000, an increase in valuation over the funded debt of $3,779,017.62 acquired during the past 16 years of municipal ownership. The total number of active meters served has increased from 31,915 in 1924 to 54,822 at the present time, or about 68%.

At the time of taking over the properties of the Southern Counties Gas Co. in April, 1924, there were ample supplies of gas available to the City in the Long Beach field for all consumers. However, due to private gas companies operating outside of Long Beach holding prior contracts with local producers, the City found itself in need of peak gas within eight months, and extensions were made into the Dominguez and Rosecrans Field 10 miles to the north of the city limits in January, 1925.

Upon the discovery of oil in the Los Cerritos section of the Long Beach Oil Field, together with a number of wells which produced larger quantities of "dry" gas, early in 1926, it was hoped the production would prove to be great enough to extend the life of supplies that would be available for City use for some time to come. It was soon found, however, that it was only in the early stage of development that a constant amount of gas could be counted on. By November, 1926, the decline in the gas supplies obtained from local fields was so great that the City was forced to look elsewhere for additional gas to meet the winter load then facing the department.

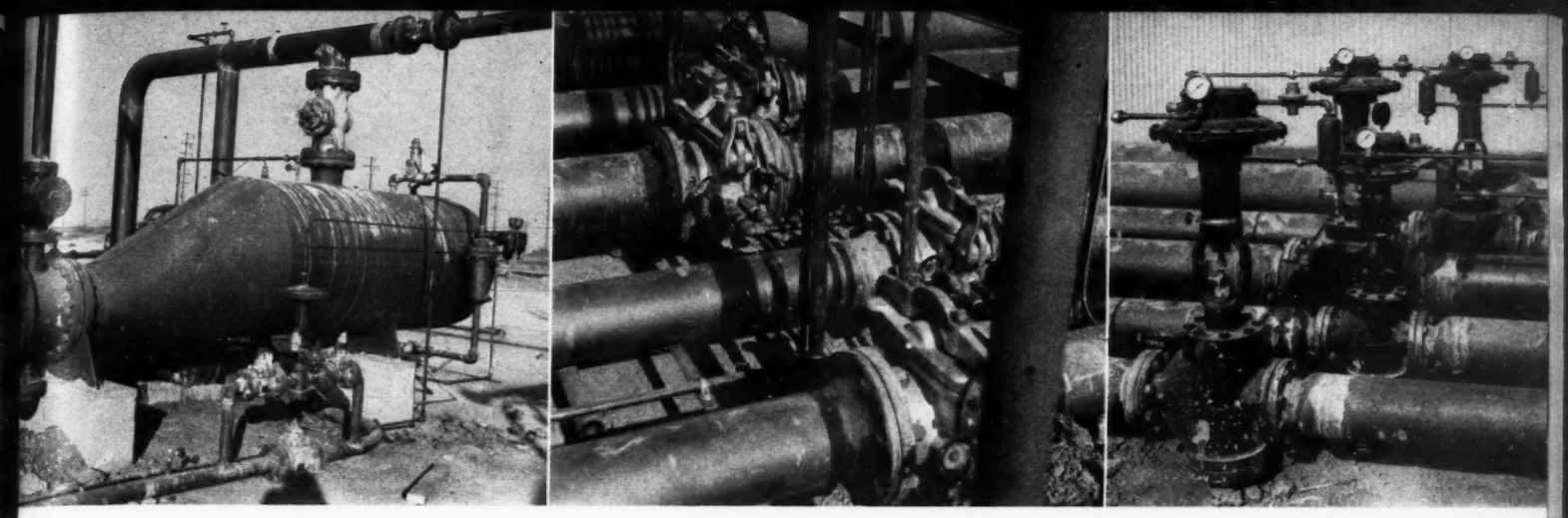
A contract was made in December, 1926, with a combination of the gas interests controlling the output from the Ventura oil field. It was agreed that a new pipe line be built from the field to City limits of Los Angeles and the City should have first call on all gas transmitted through this line up to 30,000,000 cu. ft. per day. In order to secure the contract, the City also agreed to take, daily, 10,000,000 cu. ft. during the summer months and 17,000,000 in the winter period, these amounts being the estimated peak daily supplies necessary to maintain service to the consumers in Long Beach. These daily obligations were reduced during 1928 and again in 1931. In December, 1935, a two-year contract, under more moderate terms, was put in effect, and again in 1937 the City obtained its supplies from the same utility.

Long Beach is a City of Homes: The natural gas load in Long Beach is essentially for the domestic and commercial classes of consumers. Gas is used almost exclusively for cooking, water heating and house heating. Due to the abrupt and rather wide fluctuations in temperature, provisions have to be made for shifting peaks and sudden demands, which vary according to the time of day as well as the seasons of the year. The ideal situation would be to have an industrial load available which would absorb the surpluses during the spring and summer months and other off-peak periods, and thus fill in the valleys when the use of gas by the domestic consumers is compar-

TABLE No. 1. NATURAL GAS PURCHASES BY MONTHS: 1934-41
Municipal Gas Department, Long Beach, California

Month	*1934**	*1935*	*1936*	*1937*	*1938*	*1939*	*1940*
Jan.	377,155†	409,928	391,510	623,759	466,560	484,852	477,361
Feb.	321,880	332,247	376,336	472,524	473,969	468,052	426,645
March	286,217	395,261	339,021	411,842	436,971	442,787	363,355
April	208,278	291,763	311,713	310,223	300,344	297,162	298,953
May	178,914	237,205	222,672	251,185	255,190	273,771	237,184
June	181,783	225,940	206,454	221,559	237,805	213,429	227,372
July	151,085	190,840	188,593	206,536	213,748	209,503	239,600
August	155,462	193,263	186,085	216,421	203,400	226,627	262,971
Sept.	149,843	193,233	201,734	205,556	194,568	213,924	246,708
Oct.	200,000	255,526	244,570	254,582	257,213	254,155	300,173
Nov.	276,496	355,800	293,459	326,405	387,601	315,227	398,861
Dec.	340,112	389,033	432,097	405,000	405,736	407,327	457,339
TOTALS	2,827,225	3,470,039	3,394,244	3,905,592	3,833,105	3,806,816	3,936,522

**Table computed in thousands of cubic feet.*
†Maximum day: Jan. 22, 1937, 28,924,000 cu. ft.; Max. hour, 1,850,000 cu. ft.



LEFT: Vaporizer for converting liquid into gas—Southwestern Engineering Co. CENTER: Orifice fittings in meter runs. RIGHT: Fisher wizard controllers used to maintain constant pressure on meter runs.

atively low in relation to the fall peak.

Variation in monthly and daily demands: Table No. 1 shows the variation in gas purchases between winter and summer months over the seven-year period 1934-1940. During the winter periods, the Gas Department distributes about three times as much gas as it does during the summer months.

The daily gas send-outs to the consumers in Long Beach vary as much as 100% during certain winter periods. In January, 1937, the City purchased 623,759,000 cu. ft. of gas and had a peak day's demand with a maximum of 25,964,000 cu. ft., and a peak hour on January 23 amounting to 1,850,000 cu. ft. The minimum day for the same year was on July 5 (Sunday) when but 3,349,000 cu. ft. of gas was distributed. The ratio of the maximum to the minimum day was seven and three-quarters to one.

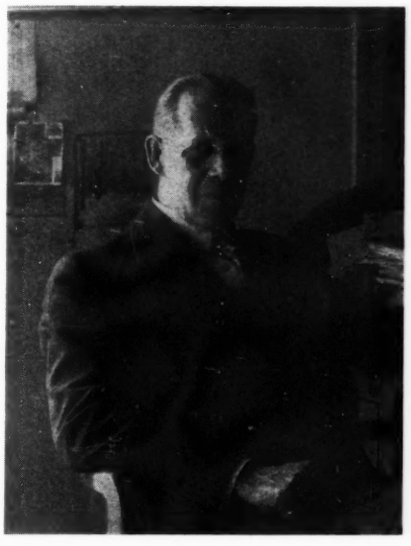
New Contract for Gas Supplies: In December, 1937, when the contract for wholesale gas supplies was again up for renewal, the City was preparing to develop its owned properties in the newly discovered Long Beach-Wilmington oil field. However, the potential production was unknown and there was no way of estimating the rate at which the wells on City lands would be brought in. It was therefore necessary to make a new contract for wholesale gas supplies.

The new contract went into effect December 28, 1937, for a two-year period, the price for gas purchased to be 20 cents per M c. f. In addition, the City would pay the gas company $.08965 per M c. f. for all gas used from City's own source of supply for domestic and commercial purposes, including gas unaccounted for.

The total amount of gas received by the Gas Department during the 12-month period following the signing of the contract for standby gas was but 449,053,000 cu. ft., and the standby charge for the first year amounted to $40,257.60. By June, 1939, the City had interests in some 56 producing wells. During the seven-month period June to December, 1939, the Gas Department received 1,681,382,000 cu. ft. of gas from these leases and, in accordance with its contract with the wholesale gas company, City paid $115,764.69 to the gas company for standby service for this seven-month period.

One Year Contract: When this two-year contract terminated on December 27, 1939, the City requested that the new contract run for a one-year period. At that time, City was receiving from its own wells its entire requirements, the total available production averaging 14,500,000 cu. ft. per day. As requirements during the peak days of January and February had exceeded 25,000,000 cu. ft. it was necessary to provide for additional gas.

After negotiations, the City accepted the terms offered by the wholesale gas company, which was to charge City 20 cents per M. c. f. for all gas delivered to the Gas Department plus a standby charge amounting to $192,000 for the 12-month period, an average of $16,000 per month to be paid whether or not City needed any gas in



E. S. BRYANT

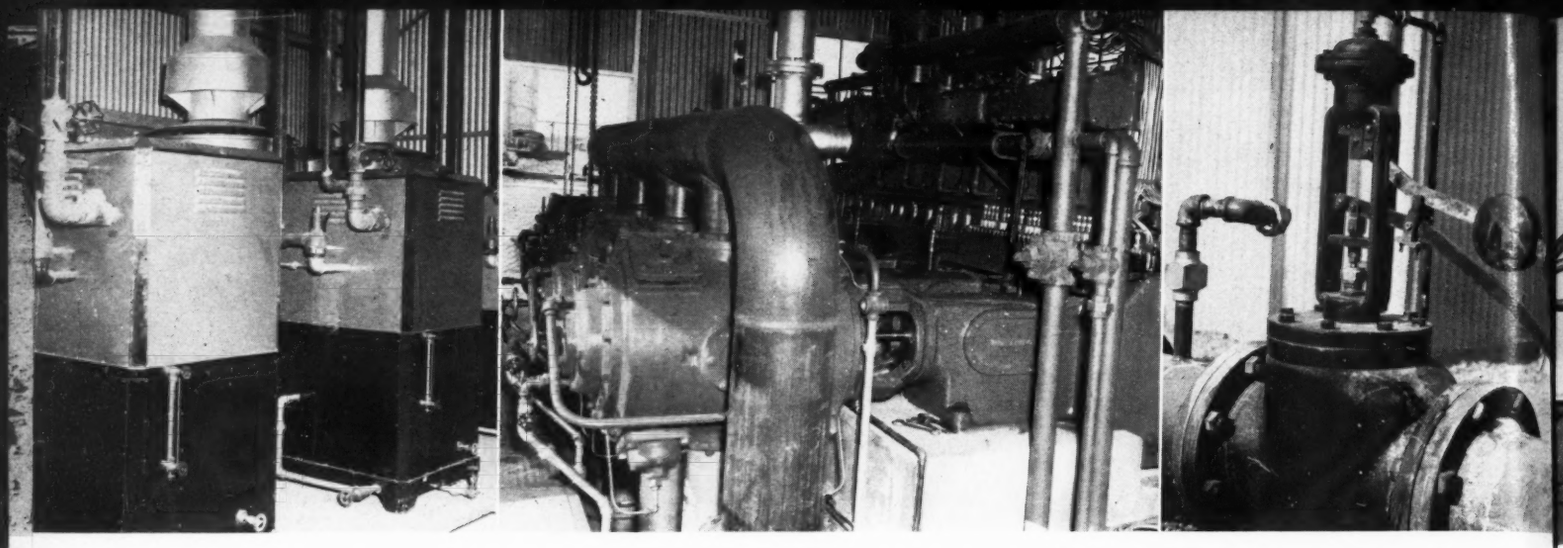
EDWIN S. BRYANT, assistant superintendent of the gas department, city of Long Beach, Calif., is a graduate of the University of Maine, class of 1898, in civil engineering. He practiced engineering and surveying in Maine and New Hampshire for many years before going to California. In 1909 he was employed by the Southern California (Domestic Gas) Gas Co. in Los Angeles, becoming civil engineer in charge of construction, which position he held until 1914.

In April, 1915, Mr. Bryant was appointed assistant gas engineer in the engineering department of the Railroad Commission of the State of California at San Francisco, and held that office until the fall of 1916, when he accepted a position as superintendent of the Economic Gas Co. of Los Angeles. Following the taking over of this company by the Southern California Gas Co. in 1920, Mr. Bryant returned to the Railroad Commission as test engineer in charge of field work of the Joint Committee on the Efficiency and Economy of Gas.

In the fall of 1923 Mr. Bryant made the appraisal and valuation of the gas properties of the Southern Counties Gas Co. in Long Beach and, in November, 1923, he was appointed as engineer of designs. Mr. Bryant is now assistant superintendent of the Municipal Gas Department of Long Beach, having served in that capacity since his appointment in March, 1928.

HAROLD W. WICKSTROM has been affiliated with the oil and gas industry in various engineering capacities for over 20 years. For the past 10 years he has specialized as a consulting engineer in liquefied petroleum gases—automotive fleet conversions, small town control plants, industrial standby plants and transportation equipment.

M. A. NISHKIAN is a graduate of the University of California in civil engineering. He was formerly with the division of highways, State of California, and the American Bridge Co. He is now chief engineer for the Oil Field Constructon Co., Long Beach.



LEFT: Kerrick-kinetic steam generators. CENTER: Two 300-hp. Worthington angle type direct driven air compressors. RIGHT: Fisher manual reset automatic shut-off valve in air line.

addition to its own supplies. In the event, however, any gas was taken from the company under the 20 cent per M c. f. charge, then seven cents for each M c. f. would be credited on the standby charge for that month.

Result of the 1939-40 Contract: During the six months, January to June, 1940, the City required but 53,934,000 cu. ft. of gas in addition to its own supplies, for which it paid the company, plus standby charge, the sum of $115,011.38, or at a rate of $2.1383 per M c. f. delivered. From July to December, the City required but 168,810,000 cu. ft., and paid $103,106.59 for this service. For the entire year 1940 the gas company delivered to the City 222,744,000 cu. ft. of gas, and received therefor $218,117.97, an average rate of $.979 for 1000 cu. ft.

Liquefied Petroleum Plant Advocated: During the early months of 1940 it appeared, due to the rapid decline in City's available gas, that a similar situation might again face the City as in the previous year.

This problem was very carefully studied by the Engineering force of the Gas Department and it was finally agreed to erect the liquefied petroleum gas-air mix plant.

Part II: Design of the Plant

By HAROLD W. WICKSTROM

Consulting Engineer, Los Angeles, California

THE Municipal Gas Department of the City of Long Beach has long been faced with the problem of providing gas during peak days in winter months.

The chart, Fig. 1, indicates the variation in daily load which is typical of the winter months in this Southern California area. Furthermore, unlike many operations this system has practically no industrial load that can be shut off.

There were several answers to the problem and consideration was given to each.

1. Continue the purchase contracts with the wholesale fuel supply company that furnishes gas to the private utilities in Southern California. This service was excellent and supplies were always available when needed, but due to the nature of the demand, the cost per thousand feet was high, particularly in the years when only small amounts of stand-by gas were needed.

2. Construct additional holder capacity. This was out of reason because of cost.

3. Construct an oil-gas stand-by. This was also eliminated as the cost per thousand would be greater than the cost of purchasing stand-by service.

4. Storage of gas in underground reservoirs. This was eliminated due to the difficulty and cost of obtaining a structure that could be utilized.

5. Construction of a liquefied petroleum gas stand-by plant. This method was decided upon on the basis of economics.

Size of Plant: A study was made of the hourly and daily peak loads and this was weighed against the assured supply of natural gas from the city-owned properties and amounts of gas that could be purchased direct from the producers in the area based on taking a fairly even daily delivery. This study indicated the need for a plant capable of producing an equivalent of 500,000 cu. ft. per hour of natural gas.

Taking into consideration the ability of the suppliers to furnish and deliver liquefied petroleum gas and using the winter of 1937-38 as a maximum requirement (Fig. 2) the capacity of the storage was decided upon at 500,000 gals.

Location of the plant: Two possible locations were available, one at a holder and compressor plant near the harbor district and one at the holder and compressor plant north of Signal Hill, and several miles from the business section. The second location was chosen because of better foundation conditions, more room, greater isolation, and to better fit into the growth of the distribution system which has a definite trend to the north of the city.

Storage Tanks: Inasmuch as the storage tanks were the largest single item of cost, considerable time was spent in determining the economical working pressure, size and shape.

The working pressure of the tanks was decided upon at 215 lbs. per sq. in. This pressure was selected to allow the use of practically all of the commercial blends of propane and butane. Although there is an ample supply of the lower vapor pressure hydrocarbons at this time and the supply is assured for at least five years on the basis of present contracts, it was decided to build the tanks for the higher working pressure to provide for more flexible specifications of the liquefied petroleum gas, which in turn would provide a number of sources of supply with a consequent lower cost of fuel. Using 1,500,000 gals. a year as an estimated fuel consumption, a fractional change in the cost per gallon well justifies the additional investment in storage.

LEFT: Safety shut-off valves in liquid gas line on tanks. CENTER: M. A. Nishkian, left, and Harold W. Wickstrom. RIGHT: Completed piping on tank showing Merco-Nordstrom valves and automatic closing mechanism.

Consideration was given to various diameters and lengths of tanks and the use of spherical tanks. The final selection of 22, 7 ft. x 105 ft. tanks was determined by an analysis of the bids on several alternates. Due to local shop conditions the small diameter tanks, while involving a substantial additional tonnage of metal for the required storage, were the least expensive per gallon of storage. The tanks were designed and constructed in accordance with the A.P.I.-A.S.M.E. code for unfired pressure vessels.

The shell thickness is $\frac{3}{4}$ in. with $\frac{5}{8}$ in. semi-elliptical heads. All seams were double-butt welded with electric arc and necessary connections were reinforced and back welded. To distribute the load at the bearing points into the shell internal ring girders were provided. These were fabricated H sections welded to the inside of the shell for strength and durability.

Each tank is provided with a 15 in. manhole and the necessary pipe connections, thermometer and safety valve connections. The tanks are set horizontally and each tank is supported by two concrete saddles. The tanks are grouted into and bolted down to one cradle called the fixed support. This foundation is designed to carry its share of the dead load plus the entire earthquake loading, having a magnitude of .2 g. based on the weight of tank and contents. To provide for expansion the other saddle is fitted with a $\frac{1}{4}$ in. admiralty metal plate covering the entire saddle and held fast in the concrete by a steel bar welded to the plate which is set in a groove in the concrete and grouted in place. The tank is free to move, the steel bearing plate on the tank sliding over the admiralty metal sheet.

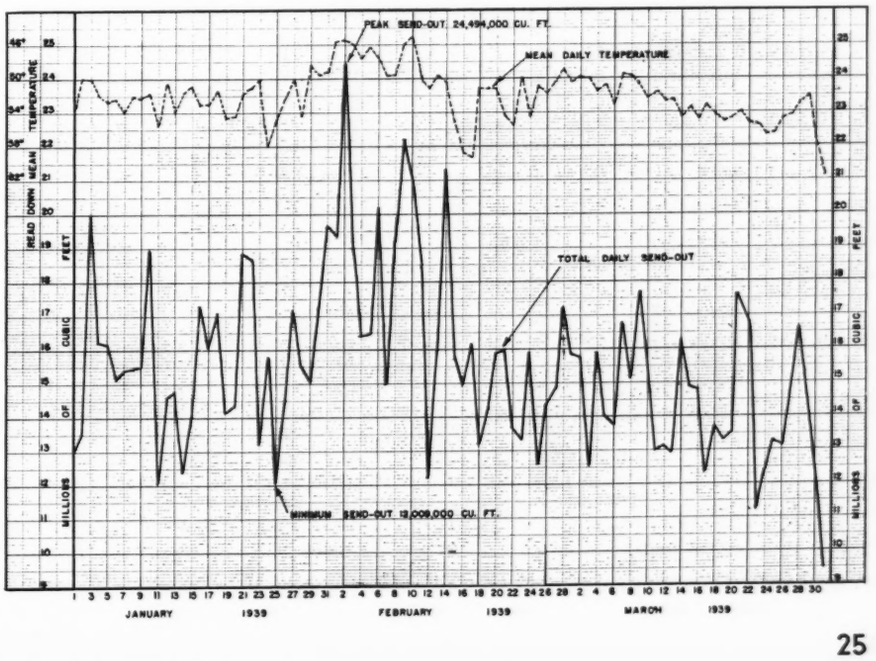
Valves and Fittings: Throughout the job from the tanks to the pressure reducing valves and wherever tank pressure might be applied steel valves were used. All lines were welded with as few flanged or screwed connections as possible.

Vaporizing System: Tanks are interconnected with 2 to 4 in. liquid headers so one or all of the tanks can be drawn upon at one time. The liquid is drawn from the tanks through a 2 in. dip pipe with the shut-off valve at the top of the tank. This construction was used to eliminate bottom connections in the tanks and to allow for flexibility in the piping to take up strains due to expansion or earthquake movement. The liquid is forced into the vaporizer by a pump and a constant level held by means of a level control working a motor valve on the pump discharge. The use of a pump in the line to the vaporizer allows for operation of the vaporizer at any temperature and pressure desired regardless of the vapor pressure and temperature of the liquid in storage. The vaporizer is a horizontal type with steam inside the tubes and LP-Gas in the shell. It is designed with a large gas reservoir to cut down the outlet velocity and prevent the carry over of entrained liquid.

Steam Generators: Heat for the vaporizer is obtained from three 50-hp. steam generators of the flash type. These are set to operate automatically, stopping and starting with fluctuations in the heat demand in the vaporizer. The condensate is returned in the form of water to the hot wells, and except for a slight amount of make-up to take care of evaporation and spillage, the system is a closed circuit obviating the need of treating the water. Flash type generators were selected due to their characteristic fast steam-up ability. Full pressure of steam can be made available five minutes after lighting.

Compressor: Two 300-hp. angle type

Fig. 1. Daily gas sendout for January, February, and March, 1939, in the city of Long Beach, California.



driven gas engine compressors provide the air for the mix. These compressors are rated at 225,000 cu. ft. per hour at 55 lbs. per sq. in. discharge pressure and are automatically controlled by unloaders and speed governors to hold the discharge pressure within 3 lbs. of the set pressure. Usual operation requires a discharge pressure of approximately 40 lbs. per sq. in. to buck distribution system pressures. It was anticipated that in the future higher pressures would be needed so the compressors were selected to take care of future as well as present needs.

Air Mix and Control: Tests previous to the design of the plant and experience in operation of similar standby units indicated the desirable range of specific gravity of the mix for proper substitute for 1050 B.t.u. natural gas was between 1.44 and 1.52. Control within this range would be satisfactory and closer control is desirable for reasons of economy and smoothness of operation. Control of the mixture is obtained by use of differential flow controllers operating from orifices in meter runs.

The LP-Gas vapors after leaving the vaporizor are reduced in pressure by a sensitive pressure reducing valve and are flowed through an orifice in a meter run. The differential set up by the pressure drop across the orifice plate actuates the flow controller which opens a motor valve in the air line. The air from the compressors is reduced in pressure ahead of the meter run and set at a pressure slightly higher than the LP-Gas meter run. The pressure drop across the orifice plate in the air meter run checks the opening of the air valve with the result that a predetermined volume of gas and air is flowed. The two streams are brought together and mixed in a turbulent mixer from whence they enter the master meter run to measure output of the plant.

A continuous sample is drawn from the mixed product and run through a recording specific gravity meter. No difficulty is experienced in holding the mixture within .02 of a point in specific gravity which variation is not noticeable in burning characteristics.

Unloading: The liquid fuel is transported from the source of supply to the plant by tank trucks and trailers. It was essential that facilities for rapid unloading be installed to eliminate waste time of the transportation units especially if there was a continued demand due to a protracted cold spell. The unloading rack is equipped with two 3 in. unloading connections so two units can be unloaded simultaneously. The liquid flows from the trucks into an underground receiver from which it is pumped to storage. It was found that connections on the tank trucks restricted the flow unduly making it necessary to throttle the discharge of the pump even while unloading two units at a time. To speed up the unloading a compressor was installed to pressure the tank trucks with natural gas. This speeded up the unloading to better than 150 gals. per minute as well as purged the transport containers of the LP-Gas vapors.

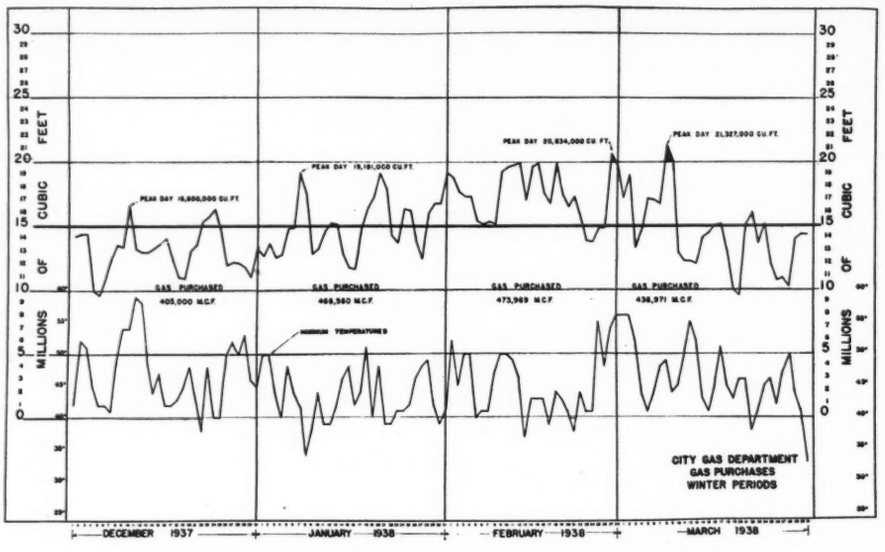


Fig. 2. Long Beach City Gas Department winter period gas purchases.

Safety Features: Due to the comparatively large amount of LP-Gas being stored in one location every effort was made to provide safety features to eliminate hazards and afford the maximum of safety.

To prevent air getting into the distribution system the plant is designed to operate only after a sufficient pressure has been developed on the vaporizer for plant operation. When the pressure is developed to a predetermined amount a manually set self closing block valve in the air line can be opened. If the pressure drops in the vaporizer due to lack of steam or supply of LP-Gas the block valve in the air line closes and the discharge to the mains closes. A stock is provided to stack the gas until the plant is operating and making specification gas.

All control valves are spring closed requiring instrument air to operate. Instrument air is carried at 17 lbs. per sq. in. pressure with four emergency valves located at the plant boundaries that can be opened, which cuts the air pressure. All valves close, fuel to the steam generators and compressors shuts off, and all the valves in the liquid lines on the tanks close by weights which are held up by air operated diaphragms when the plant is operating. In addition fuse plugs are inserted in the instrument air lines so the pressure will be released in the event of fire exposure.

The main tank and operating area is protected by spray nozzles. The water for the nozzle operation comes from a 12 in. main and the control valves to the spray headers are located 100 ft. away from the nearest tank. Main pressure is sufficient to operate the nozzles but provision was made for use of fire department booster pumps by installing a fire hydrant and hose connections into the water line at the road. The truck unloading rack is protected by heavy pipe guards and is isolated from the balance of the plant.

The entire yard area under the tanks was paved with 2 in. of black top to afford good drainage and prevent the growth of weeds. Fire extinguishers both of the hand type and buggy are located at convenient points for use in case of emergency. The operating crews were instructed in both normal operation and emergency conditions.

When there was any question as to safety no expense was spared to provide the best of equipment available and sound engineering practice was followed in all phases of the design and construction. Designs were completed and contracts awarded in 1940. The plant was completed and ready for test on December 1. LP-Gas delivery was started the following week and the plant was tested and ready for operation before the end of the year. Due to a mild winter the plant has not been called upon to function up to this writing. The plant has been run several times with various amounts of mixed gas put into the distribution system with no material increase in customer complaints.

Part III: Construction of the Plant

By M. A. NISHKIAN

Chief Engineer, Oil Field Construction Co., Long Beach, California

THE world's largest liquefied petroleum gas air-mix plant has been placed in standby service for the Municipal Gas Department of the City of Long Beach, Calif., the construction work having been completed by the Oil Field Construction Co. 25 days ahead of schedule. Work was started on August 20, 1940, and the completed plant was ready for test runs on December 20, 1940. The completion date had been set for January 15, 1941.

Following are the high lights of the various phases of construction on the project.

Excavation: The soil in the tank farm area is a grey clay hard pan, which under tests showed bearing power capacities in excess of 8000 lbs. per sq. ft. Due to stability of soil, the spread footings were not formed, but were excavated with power shovels and then carefully trimmed with air spades to finished dimension.

Excavation for engine foundations was carried approximately 12 ft. below grade since character of soil in this area necessitated this depth. All the structural excavation was carried to undisturbed soil.

Forming and Concerte Pours: Forming concrete work for the tank footings was accomplished with the use of 5/8 in. veneer plywood to insure smooth finish as well as true alignment of footings. Panels were well treated with oil before each usage to insure against water absorption by the plywood from the concrete.

Forming and pouring were so scheduled that forms for only six tanks at one time were needed. The ease and simplicity with which the panel forms were erected expedited the concrete work. For all interior and exterior exposed surfaces five-ply panel was also used in forming.

All concrete used was 2000 lb. and was well tamped with mechanical vibrators to insure a uniform and dense mixture. Footings were reinforced. Because of ease of accessibility with elevated mixers, transit mix was used on all large pours. All concrete for tank footings was properly water-cured and concrete was allowed to set for 28 days, thereby reaching its ultimate design strength before any load was placed on the footings.

Cleaning and Grading: Clearing and grubbing of site was readily done, and grading for the tank farm area and compressor building site together with roads was accomplished with use of caterpillar driven bulldozers and carryall units. Approximately 7000 cu. yds. of dirt were moved in grading the farm area, which was then brought to a finished grade, and readied for a 3-in. macadam pavement with eight-ton rollers, which assured a compact sub base.

Equipment Installation

Compressors: Power ends of both units were respectively placed on foundations carefully leveled by expert mechanics and then grouted in their final positions. The compressor cylinders were then hung on and connected. The units were checked to assure mechanical perfection.

Steam Generators: The three steam generators, which are of the automatic self-contained type were set and leveled ready to receive the pipe work.

Pumps: Both the unloading pump and the vaporizer pump are of the submersible type. These pumps, together with motor are incased in a 10 in. pipe barrel, and the entire unit is set in the ground, inside of a cast in place sheet piling. After units were carefully aligned, approximately 2 in. of grout was then poured between sheet piling and pump barrel.

Vaporizer: This unit was fabricated in Los Angeles shops, hauled and placed on concrete footings, aligned, grouted, and ready to receive the pipe work, which had been preassembled.

Instruments and Control Equipment: All control instruments were installed under supervision of expert mechanics since this phase of the work was one of the most important to assure proper operation of plant.

Tanks: The 22 76 in. by 105 ft. tanks were fabricated in a Los Angeles shop under A.S.M.E. and A.P.I. code specifications for pressure vessels and were hauled on dollies to the job. Due to the great length of these tanks, permits to haul them were only issued during hours of least traffic.

The placing of the tanks on the foundations was so planned as to minimize turning of the tanks. The tanks in their final position were to lay in an east and west direction. A road parallelling the job site was used to bring the tanks to the tank area. From this point the dolleys were rotated 90 degrees, and then it was a simple matter of pulling each tank on its respective foundation.

Pipe Work and Welding: All pipe work, performed by men thoroughly familiar with this class of work, was carefully assembled to insure against leaks or strained assemblies. Large manifolds and headers were made on the job. Liquid lines in and out of tanks together with some of the steam piping were pre-fabricated in the shop. Practically all the pipe work and welding were done on the job. All welders both in the shop for the tanks and field welders were qualified.

Testing: All piping and welding were carefully tested to approximately five times the working pressure of the plant, and no leaks were present.

The various units were then placed in operation, each independent of the other, and the equipment was tuned up for proper performance. All equipment having been adjusted for operation the test runs were begun and successful operation was made.

The unloading rack showing trucks and trailers unloading.

Banishing the Scrap Pile

KEEPING down repair costs, maintaining equipment in condition for high operating efficiency, and having machines ready for service when required are major problems in practically any gas plant.* The methods used by one plant for solving these problems should be of interest to all plant maintenance shops, for the procedures employed are applicable to a wide variety of industrial-plant equipment.

This particular utility company operates a large number of gas-engine-driven compressing stations for compressing natural gas. Two years ago, before they began using welding to any great extent, their scrap pile was something of major concern to plant officials. Since the introduction of bronze-welding and the use of other oxy-acetylene processes, however, the scrap pile has become a thing of the past, and the plant is now effecting substantial savings through the reclamation of a wide variety of parts.

The two most important bronze-surfacing applications are for gas-compressor pistons and gate-valve disks and rings. To date, more than 100 gas-engine power pistons and compressor pistons have been rebuilt and put back into service at about one-half the cost of new pistons.

Savings on gate valves are equally impressive. Worn disks and rings which formerly were scrapped can be bronze-surfaced for about one-eighth the cost of new parts. Since this plant reclaims between 500 and 600 gate valves a year, savings on this application alone run to several thousand dollars annually.

Power and Compressor Pistons: Power pistons and compressor pistons range from 13½ in. to 32½ in. in diameter. During service, both pistons and cylinders wear out-of-round, thus seriously affecting the efficiency of the compressor unit. Cylinders have to be rebored, and the pistons rebuilt to size.

The first step in reconditioning the cast iron pistons is to rough-turn their surface so as to remove oil and dirt. The corners of the ring grooves are rounded to about a ½-in. radius to prevent burning and cold laps when the bronze is deposited.

Pistons are preheated with natural gas. As indicated in Fig. 1, the piston rod is supported at both ends by rollers. The pistons are located directly over the preheat burner which is in a pit in the welding-shop floor. A rope is wound around the piston rod and attached to a chain hoist so that the piston can be rotated during preheating and welding. Smaller pistons are rotated by means of a wrench attached to the piston rod at the operator's left. Finally, a temporary firebrick furnace is built around the piston. Preheating takes from 1 hr. to 1½ hr., or until the piston reaches a cherry-red heat.

Oxweld No. 25 M. bronze welding rod is used for the rebuilding operation. The rods are fluxed before welding by placing them in a piece of channel iron and warming them with the blowpipe. Then flux is sprinkled on the warmed rod. Every 100 lb. of rod requires 1 lb. of flux.

The bronze rod is deposited with an Oxweld W-17 blowpipe, with the flame adjusted to neutral. The first step is to fill in the piston-ring grooves flush with the outside diameter of the piston, as shown in the top sketch of Fig. 2. The metal is deposited at a point about 45 deg. above the horizontal center line. This is a convenient point at which to do the welding as the molten metal does not flow too far ahead of the point of deposit and, therefore, does not tend to trap the gases from the cast iron. Welding halfway between the top and side permits the gases that may form to escape readily, thus preventing porous welds.

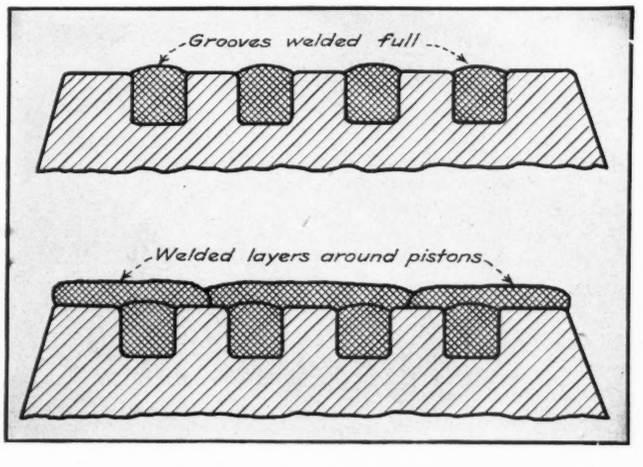
The direction of welding is towards the top of the piston, and as the operator approaches the horizontal surface, he simply pulls on the chain hoist, thus rotating the piston approximately 45 deg. towards him. This takes only a second or so, but during this operation the blowpipe flame is held over the bronze puddle so as to prevent loss of heat.

After the piston ring grooves are filled in, deposits of bronze, each about 6 in. wide and 5/16 in. thick, are laid over the entire surface of the

*From an article, "How Bronze-Welding Cuts Gas Plant Maintenance Costs," which appeared in the July, 1940, issue of *Oxy-Acetylene Tips*, published by Linde Air Products Co. — Abstract by *GAS*.

FIG. 1. The piston is preheated and welded in a firebrick furnace, with the piston rod supported on rollers. The operator is turning the piston with the rope sling.

FIG. 2. Cross-hatched areas of the upper sketch show how ring grooves are first filled in. Then the outside circumference is bronze-surfaced as shown below.



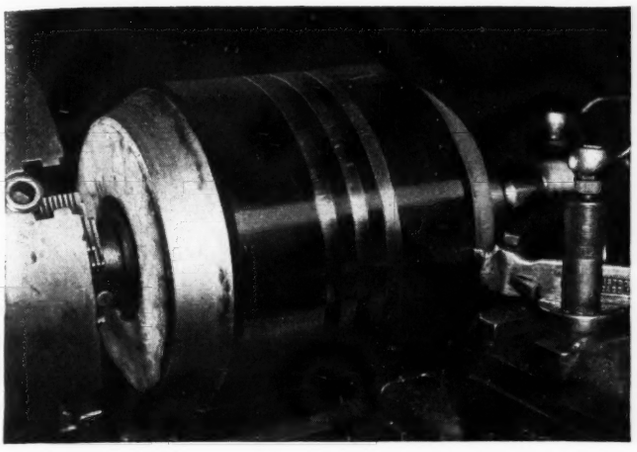


FIG. 3. Here is an 18-in. piston during final machining. Total cost for reclaiming a piston by this method is about half the cost of a new piston.

FIG. 4. This close-up shows the seating surface of one side of the disk almost completed. The bronze deposit is approximately ⅛ in. in thickness.

piston. It usually takes about three such strips of deposited metal to cover an average piston, as shown in the lower of the two sketches in Fig. 2. Pistons are rebuilt about ⅛ in. (on the diameter) oversize to provide sufficient metal for finish-machining. Generally one layer of bronze is all that is required, but on badly worn pistons, two layers are sometimes necessary.

During the entire bronze-surfacing operation, the piston is maintained at a temperature of about 1400° F. Following welding, the pistons are allowed to cool in the air.

Finally the piston is placed in a lathe and machined to the desired diameter, and the piston-ring grooves are cut. An 18-in. diameter piston being finish-machined is illustrated in Fig. 3.

To reclaim a 14-in. compressor piston requires 90 to 100 pounds of bronze welding rod, 12 to 14 hrs. to do the welding, and 6 hrs. for the machine work. A 24-in. power piston requires practically double the time and materials as the 14-in. size. A 29-in. piston required 356 pounds of bronze rod and 38 hrs. welding time.

Worn piston rods are rebuilt by the metal-spray process and then machined to original size. The piston rods are first rough-grooved and knurled to assure a good mechanical bond. Then carbon steel of the requisite hardness and in the form of wire is sprayed on the rods until the diameter has been increased about ⅛ in. After this operation, the rods are turned and polished to the original diameter.

Gate-Valve Disks and Rings: Gate valves ranging in size from 2-in. to 20 in. are regularly rebuilt at this gas plant, although 3 in. valves are usually the smallest size handled.

Disks and seat rings are first removed from the valve and faced on a lathe prior to welding. To save time and to facilitate centering, rings are held in a special mandrel. Seating surfaces are cut down just enough to true them up and to remove all pit marks. Pressed-brass seat rings are often machined completely out before rebuilding with bronze.

Preheating with natural gas is carried on until the disk reaches a dull red temperature.

When brass seats are rebuilt, thorough preheating is especially essential. The part is preheated to a dull red and held at this temperature until there are no signs of a greenish-blue flame around the surface. This flame is very similar to that produced by the combustion of gases in a covered charcoal fire and indicates that gases are being liberated by the heated metal. If these gases are not completely driven out prior to welding, the resultant bronze deposit will be unsuitable because of excessive porosity.

After preheating, the disk is transferred to a welding table, as shown in Fig. 4. This table can be rotated by merely pushing the top of the disk with the welding rod.

For the 12-in. disk shown, the operator is using an Oxweld W-17 blowpipe with No. 12 head. Oxweld No. 25 M. bronze rod is used for the welding operation, the rod being prefluxed as described previously. The size of rod used depends on the size of valve, as follows: ⅛ in. rod for valves less than 4 in. in diameter; 3/16-in. rod for 4-in. to 8-in. valves; ¼-in. rod for valves from 8 in. up.

The bronze rod is deposited with a neutral flame. The average valve disk requires a deposit of ⅛-in. thickness along the seating surfaces on each side. After the bronze-welding operation, the surface of the deposited metal is remelted and smoothed out with the blowpipe flame. Finally, the bronze surface is machined, the parts are re-installed in the valve bodies, and the valves are returned to service.

■ ■

Employer May Assist Draftee In Securing Deferment

According to a recent communication from National Headquarters, Selective Service System, an employer may assist an employe in being deferred by appending an affadavit to his questionnaire giving full information as to that employe's position with his company, his value to it, and the relative shortage of other persons capable of filling the employe's place.

The employer should also state any facts which support the claim that the removal of the employe, without immediate replacement, would cause a material and substantial loss of effectiveness or productivity in the employer's enterprise.

■ ■

Citizens Gas & Coke Co. Has Large 1940 Increase

Record increases in gas consumption and number of gas meters in service have been reported by officials of Citizens Gas and Coke Utility, Indianapolis, Ind., for the year just ended.

Total gas consumption for 1940 reached the unprecedented volume of almost 4,500,000,000 cu. ft., an increase over 1939 of over 500,000,000 cu. ft. A new all-time high was reached by industrial gas consumption; Over 1,000,000,000 cu. ft. of gas was used by Indianapolis industries in 1940, averaging better than 3,000,000 cu. ft. a day. This volume of industrial gas consumption represents a 204,000,000 cu. ft. increase over 1939.

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More Gas Sold in Hamilton

Hamilton, Ohio, which operates a municipal gas system, recently reported an addition of 171 customers in an 11-month period. Records also show a total of 383,855,000 cu. ft. of gas purchased from the Cincinnati Gas and Electric Co., Cincinnati, during the first 11 months of 1940, as compared with 361,993,700 cu. ft. during a corresponding period in 1939.

A.P.I. Pipe Coating Tests

By KIRK H. LOGAN

National Bureau of Standards, Washington, D. C.

IN 1930, the American Petroleum Institute, with the cooperation of manufacturers of protective coatings and the National Bureau of Standards, undertook a study of protective coatings for pipe line for the purpose of establishing the engineering principles involved in the design, selection, and application of such coatings. The procedures for testing the coatings were agreed upon by the cooperating parties, and have been described in detail by Scott, who supervised the application of the coatings and reported[1, 2, 3, 4] the first three inspections.

The coatings originally were exposed at 16 test sites. Denison has attempted to correlate some of the soil properties with the early performance of some of the coatings in the test.[5]

Two Divisions

The coatings tested can be divided into two divisions:

1. Types of coatings each representative sample of which was applied in duplicate to approximately 30 ft. of an operating pipe line or its equivalent. Each of 19 coatings was applied in duplicate sections to the pipe line at from 8 to 12 test sites. Between each group of two coatings applied to the pipe line, 20 ft. of the line were left uncoated. In the same trench at the side of each line coating but not touching it, five 2-ft. sections of bare 3-in. pipe were laid at equally spaced intervals to serve as control specimens. Three such control specimens were laid beside each section of bare pipe line.

2. Each coating applied to line pipe was applied also to 2-ft. lengths of 3-in. boiler tube (hereafter referred to as short pipe sections). Three specimens of each of these coatings and an equal number of specimens of each coating which was applied only to the short pipe sections, a total of 46 varieties of coatings, were buried at each of the 16 test sites as described in Progress Report No. 1.[1] This permits a comparison of all coatings tested on the 2-ft. lengths.

Ewing[6] has shown that the chief differences between the results of the two tests are caused by: (1) differences in the exposed areas of the specimens; and (2) more favorable conditions for the application of the hand-applied coatings on the short pipe sections. It is possible that important differences in the behaviour of the coatings on the short pipe sections and on the pipe line are caused by the greater weight and the movement of the latter. Line temperature may have had some effect.

The present report follows the form of the fourth report[4] in order that readers easily may compare the data in the two reports and note the changes resulting from the longer exposure, six years, of the coatings. This report contains also some additional data resulting from a more detailed examination of the pipe lines with respect to pits.

Table No. 1 is a summary of the conditions of the pipes beneath the coatings at all the test sites. Like most summaries it omits details which under some circumstances may be important, and care should be used in drawing conclusions from it. Not all of the coatings were exposed to the same soil conditions; and, as the sites differ greatly in corrosiveness and the coatings differed greatly in the way the corrosion was distributed beneath their surfaces, it is probable that the table does not show accurately the relative merits of the coatings.

Table No. 2 gives some details of the make-up of these coatings.

Summary of Observations

The data on the conductance of the coatings lack uniformity. Not infrequently one section of a coating showed many times the conductance of another section of the same coating at the same test site. In many cases it is difficult or impossible to determine whether this lack of consistency is the result of lack of uniformity in the thickness or composition of the coating, poor application, or non-uniform soil conditions. The same statements are applicable to maximum pit depths. The important fact is that the amount of protection afforded by many coatings was not uniform even under nominally the same condition. Either the coatings as applied were not uniform or they lacked a sufficient factor of safety to provide against the variations in the exposure to which they were subjected.

K. H. LOGAN

THE FINAL report (Report No. V) on the American Petroleum Institute's Pipe Coating Tests was presented by Mr. Logan at the 21st Annual Meeting of the Institute, Stevens Hotel, Chicago, Ill., on November 14, 1940. Report No. V was made to the Topical Committee on Pipe Line Technology (formerly the Topical Committee on Corrosion of Oil Field Equipment) of the Central Committee on Pipe Line Transportation, Division of Production, American Petroleum Institute. This report presents the findings from the fourth and final inspection of pipe coating tests on operating lines and the third and final inspection of short coated sections. Publication approved by the director of the National Bureau of Standards, U. S. Department of Commerce, Washington, D. C. — (Abstract by G A S.)

General Increase

There was a general increase in the conductance of the coatings over that observed in 1934. This indicates that the usefulness of the coatings is limited with respect to time. There are individual exceptions to this generalization.

As a class, the coatings which were applied cold and were not reinforced or shielded showed more cases of exposed pipe than did the thicker coatings.

Zinc chromate and baked-on red and blue lead appear to be satisfactory as undercoats under the conditions to which they were subjected. The bond between the undercoats and the pipe was stronger than that between the undercoats and the coatings applied over them. These undercoats seem to have reduced corrosion, but did not afford adequate protection to pipe in corrosive soils.

TABLE NO. 1. SUMMARY OF CONDITIONS OF LINE PIPE UNDER COATINGS.

Coating				Unaffected		Rusted		Metal Attack		Pitted		Depth Deepest Pit (Mils)
Symbol	Thickness (Mils)	Character	Total Feet Inspected	Total Feet	Per Cent	Total Feet	Per Cent	Total Feet	Per Cent	Total Feet	Per Cent	
		1. COLD APPLICATIONS										
C	21	Cutback coal tar	166	2	1.2	9	5.4	16	9.6	139	84.5	322+*
A	65	Asphalt emulsion	178	0	0	0	0	3	1.7	175	98.3	322+*
		2. ENAMELS										
N	60	Coal-tar-asphalt enamel	152	21	13.8	21	13.8	16	10.7	94	62.0	264
K	69	Coal-tar-asphalt enamel	183	13	7.2	15	8.2	54	29.6	101	55.0	195
M	58	Coal-tar enamel	151	0	0	0	0	3	2.0	148	98.0	231
L	80	Coal-tar enamel	157	31	19.8	6	3.8	10	6.4	110	70.1	322+*
		3. MASTIC										
O	519	Asphalt mastic	213	154	72.5	39	18.4	14	6.6	6	2.8	38
		4. SHIELDED COATINGS										
Y	29	Cutback asphalt	164	2	1.2	17	10.4	30	18.3	115	70.0	200
F	419	Asphalt emulsion	170	6	3.5	66	39.0	37	21.8	61	35.9	107
G	63	Coal-tar-asphalt enamel	202	59	29.3	36	17.9	51	25.3	56	27.8	322+*
H	81	Coal-tar enamel	177	76	43.0	7	4.0	9	5.1	85	48.0	240
		5. REINFORCED COATINGS										
B	107	Grease	208	0	0	9	4.3	61	29.4	138	66.3	89
S	150	Asphalt	166	0	0	2	1.7	39	23.5	125	75.3	290
E	151	Asphalt	192	9	4.7	17	8.9	70	36.5	96	50.0	197
Z	201	Asphalt	228	1	0.4	22	9.7	105	46.1	100	44.1	160
R	143	Asphalt enamel	208	42	20.2	19	9.2	42	20.2	105	50.5	197
T	351	Coal-tar-asphalt enamel	218	67	30.8	13	6.0	51	23.5	87	39.9	126
U	171	Coal-tar enamel	175	26	14.9	25	14.3	58	33.1	66	37.7	58
X	230	Asphalt	229	12	5.2	31	13.5	140	61.1	46	20.1	124
Total	.....	.....	3,537	521	14.7	354	10.0	809	22.9	1,853	52.2	.....

*Through pipe.

The number of coated pipe showing patterns was greater in 1940 than in 1934, although some sections which showed a positive pattern in 1934 showed none in 1940. The pattern tests indicate a continued decrease in the protection afforded by most of the coatings.

Only four test sites were severely corrosive, as indicated by the depths of the pits on unprotected sections of pipe. The majority of the test sites were, therefore, favorable to the coatings if pit depths are used as criteria for the effectiveness of the coatings. There is no consistent difference between the depths of the deepest pits on uncoated sections of line pipe and on the short pipe sections.

On the average the pipe under more of the coatings showed corrosion in 1940 than in 1934, and the maximum pit depths were greater for most coated sections.

In general there were fewer pits under thick coatings than under thin ones, but the depths of the pits under a thick coating were sometimes greater than under a thinner one, so no hard and fast rule can be made.

Because the coatings differ in many ways, it is impossible to determine positively whether the machine-applied coatings were superior to those applied by hand or to determine the relative merits of coal tar and asphalt as protective coatings. Likewise the data do not show clearly whether impregnated asbestos felt was superior to organic materials as a reinforcement. However, as a shield it did not deteriorate as did the organic materials. It is evident that the layer of cement-sand mortar over the bituminous coating was insufficient to prevent serious pitting in a corrosive soil.

All of the coatings reduced the number of pits per unit area of surface, and most of the coated sections of pipe showed shallower maximum pit depths than occurred on the corresponding unprotected pipe. Several of the coatings afforded nearly complete protection to most of the sections of pipe to which they were applied, but no coating completely protected all sections.

The purpose of the test was to establish engineering principles related to the manufacture and use of protective coatings for pipe lines. The following are some of the facts established by the test:

1. Many of these coatings will reduce greatly corrosion during at least 10 years (the period of this test) — although complete protection from all corrosion has not been realized in corrosive and destructive soils.

2. The effectiveness of all coatings tested decreased throughout the period of the test. This in most cases is the result of continued soil pressure and the absorption of water. There appears to be little change in the coating materials other than the organic fabrics used as reinforcements or shields.

3. Shields and reinforcements should be permanent and sufficiently rigid to distribute soil stress and pressure due to the weight of the pipe over such

areas as will avoid flow of the bituminous or other material used in the coating.

4. Thickness of material is an important factor in coating construction.

5. A coating should be sufficiently rigid to withstand pressures over long periods, and elastic enough to withstand stresses resulting from pipe movement and sudden changes in temperature. These requirements are difficult to reconcile.

6. A coating which fails to protect at a few points may cause, under certain conditions, deeper pits than would have occurred on uncoated pipe in the same location.

7. Many soils are only mildly corrosive, and no protective coating is required in them unless the cost of a leak is abnormally high.

8. The economics of the general problem should be considered.

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[6]S. P. Ewing, *Soil Corrosion and Pipe-Line Protection*, Am. Gas Assoc., New York (1938).
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TABLE NO. 2. COATINGS APPLIED TO LINE PIPE.

Symbol	*Description*
A	Two coats of asphalt emulsion.
B	One coat of grease, spiral wrap of grease-saturated fabric (Osnaburg type), and outer coat of heavier-consistency grease.
C	Two coats of filled cutback coal tar.
E	Asphalt primer, followed by sling coat of asphalt compound, spiral wrap of coal-tar-saturated Osnaburg fabric, outer coat of asphalt and Kraft paper.
F	Two coats of asphalt emulsion, followed by rigid shield of sand and cement mortar.
G	Coal-tar primer, followed by coal-tar-asphalt enamel, and unbonded wrap of asbestos pipeline felt.
H	Coal-tar primer, followed by coal-tar enamel, and unbonded wrap of wood veneer.
K	Coal-tar primer, followed by coal-tar-asphalt enamel.
L	Coal-tar primer, followed by coal-tar enamel.
M	Coal-tar primer, followed by coal-tar enamel.
N	Coal-tar primer, followed by coal-tar-asphalt enamel
O	Asphalt primer, followed by a hot coat of priming asphalt, and spiral wrap of asphalt mastic carried on pipe with tissue and sheathing paper (machine-applied).
R	Asphalt primer, followed by two coats of asphalt enamel; spiral application of asbestos pipe line felt; flood coat of enamel, and Kraft paper (machine-applied).
S	Asphalt primer, followed by two coats of asphalt; spiral application of rag-base pipe line felt; flood coat of asphalt, and Kraft paper (machine-applied).
T	Coal-tar primer, followed by two straight-away rag-base pipe line felt applications on the inner faces of which coal-tar enamel mopped on; sling coat of coal-tar enamel, and whitewash.
U	Coal-tar primer, followed by two coats of coal-tar-asphalt enamel; spiral application of asbestos pipe line felt; flood coat of enamel, and Kraft paper (machine-applied).
X	Hot asphalt primer, followed by double-spiral wrap of unsaturated fabric (Osnaburg type) drawn through molten asphalt, and spiral-butt wrap of 20-gage strip steel.
Y	Asphalt primer, followed by one coat of asphalt cutback; one coat of asphalt adhesive, and machine-wrap of aluminum foil.
Z	Hot asphalt primer, followed by double-spiral wrap of unsaturated fabric (Osnaburg type) drawn through molten asphalt, and Kraft paper (machine-applied).

Reserve Gas Pipe Line Co. Hearing Draws Near

ALTHOUGH no definite date has yet been announced, officials announced recently that the Federal Power Commission hearing on the Reserve Gas Pipe Line Co. application for a natural gas line from Texas to New York City will probably be set for the end of January.

The importance of this project, which will feed the richest potential natural-gas market in the country, has aroused belief that the hearing might take place before the entire Federal Power Commission.

The company this summer asked the commission for a certificate of public convenience and necessity to build a line extending from the Texas Gulf Coast fields through 10 states into New York. Cost of the project is estimated at $80,000,000. Plans call for the construction of a 24-in. main transmission line, two 10,000-hp. stations on the south end of the line, and 11 stations of 9000 hp. each. No amendments to its application have been filed by the Reserve company, so the probability is that it contemplates no changes in its original plans.

■ ■

Negotiations Under Way for Minnesota Gas Line

The Waldorf Paper Products Co., of St. Paul, Minn., has recently notified the city that it is negotiating for the "purchase or lease" of the natural gas line now supplying its fuel. This is the same line, owned by Peoples Natural Gas Co., Omaha, Neb., which feeds the Ford Motor Co. glass plant. Ford notified the city that it also is negotiating for the purchase of this line.

■ ■

Lone Star Gas Co. Completes Pipe Line Addition

Lone Star Gasoline Co. of Dallas, Texas, has now completed the 48-mile 8-in. welded gas pipe line it was laying from San Angelo, Texas, to the Page field in Schleicher County, Texas. The system will furnish gas to the Air Corps Advanced Flying School in San Angelo, due to be opened early last month, and beginning May 6, 1941, will move gas from the wells of the Cooper Gas Co., San Angelo, to the West Texas Utilities Co.'s electric generating and water-pumping plant in San Angelo to supply its fuel requirements.

■ ■

Standard Oil Develops New Field in Canada

The Standard Oil Co. of British Columbia, a subsidiary of Standard Oil of California, has discovered a new oil and gas field in Canada.

The structure is located near the town of Princess, Alberta, about 125 miles east of the Turner Valley field, where Standard also has production. It is located in a country that has had only nominal production and it is close to large consuming markets of Eastern Canada.

Natural Gas Pipeline Co. Plans New Line Project

PLANS are now being made to enlarge the capacity of the main trunk line transmission system of the Natural Gas Pipeline Co. of America between the Texas Panhandle and Chicago by the construction of five loops which will consist of a total of 394 miles of 26-in. pipe, not including the pipe to be laid for multiple lines at 20 river crossings. Contracts will be let for construction of these five loops in four contracts, while contracts for river crossings are to be let separately.

The program calls for construction work in Texas, Kansas, Nebraska, and Iowa, and has been planned so that it may progress from the western end northeastward.

■ ■

Colorado Pipe Line Project Now Under Consideration

According to recent reports, the Public Service Co. of Colorado is considering plans to lay a natural gas pipe line from Piceance Creek, Colo., for a distance of 60 miles to Grand Junction, Colo. The company has been investigating the situation in a general area which includes the Leadville mining district as well as Grand Valley, where Grand Junction is located. In this general area there are the United States Grand River reclamation project, Gilman Empire Zinc Co.'s Eagle mine, reputedly one of the largest in the world, and Climax Molybdenum Co.'s mine at Leadville.

Texas Recycling Plants Report Increased Activity

GAS recycling and repressuring plants continue to show a month-to-month increase in liquid recovered from gas processed in the northeast quarter of Texas, according to composite reports from the 13 operating plants in this part of the state.

Daily average recovery of liquid during October was 422,083 gals. compared with a September daily average of 387,026 gals. And the rate of recovery also showed a gain, totaling an average of 1.013 gals. per M c.f. of gas processed during October and 0.984 gals. per M c.f. during September.

There were 11 gas recycling plants and two gas repressuring plants operating each month, but the number of gas intake wells showed a continuous increase, totaling 74 wells in October, 71 in September and 69 in August, 1940. Volume of gas processed by the 13 plants also increased monthly totaling 416,808,000 cu. ft. in October, 393,406,000 in September and 339,983,000 for August.

■ ■

Natural Gas Outlet Okayed For New Michigan Fields

The Michigan Public Service Commission recently authorized Consumers Power Co., Jackson, Mich., to construct a pipe line providing a natural-gas outlet from new Michigan fields in Clare, Osceola and Missaukee counties, Michigan. Commission engineers said the line will provide a test of the rate of pressure decline by which reserve of the fields, together considered the second largest in Michigan, may be determined. Consumers Power Co. plans to place 38 miles of 12-in. line to connect its pipe line system near Midland with fields of total proven acreage, estimated at 7500 acres, now the location of 16 producing wells. Construction contracts have been let to J. C. Dowding, general contractor, of Flint, Mich.

■ ■

Oklahoma Natural Gas Finds Increase Total Reserve

Extensions of existing gas fields appreciably increased the natural gas reserves of Oklahoma during 1940.

The most important strike was in the new Charlson zone, at 4200 ft., in the Chickasha field of Grady county. Although opened earlier, the new zone was not exploited until the last half of last year.

The Guymon sector of the Hugoton field in Texas county, Okla., was extended in three directions. Two new gas horizons were discovered in the Cement field, while a few wells were completed in the deep gas zone on the west side of that field.

■ ■

Important Gas Strike Made In Eastern Kentucky

Considerable excitement was caused recently in Paintsville, Ky., as a result of the drilling in of a producing gas well on the Albert Horne farm, about three miles west of that city. The flow of gas was found at the bottom of the Corniferous lime in what was considered wildcat territory, although oil men and geologists have looked favorably upon that territory for many years. Some of the largest producing companies, including the Inland Gas Corp., Ashland, Ky., hold large blocks of leases in the vicinity of the new strike.

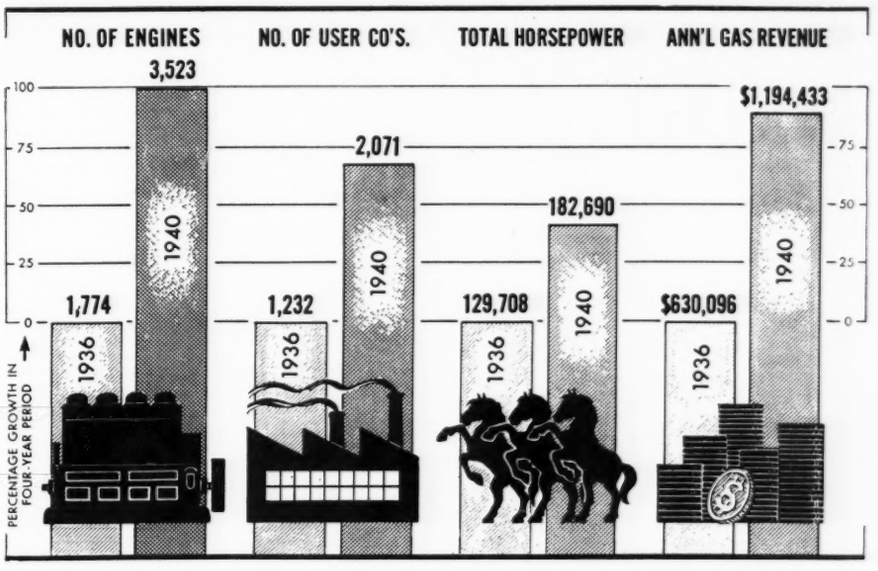


FIG. 1. Four Years of Growth in the Industrial Acceptance of Natural Gas Engines for Power Development—as reported by eight natural gas utilities serving 45% of the gas engine business reported in 1940 A. G. A. census.

Gas Engine Load Doubles in 4 Years

GROWING interest on the part of industry in power development by operating internal combustion engines on natural gas fuel was revealed in a survey of natural gas utility companies serving fuel for engine consumption conducted by the Gas Engine Power Committee of the Industrial and Commercial Section, American Gas Association. The results: (1) there are twice as many gas engine installations as existed four years ago; (2) greatest development of the field among those enterprises where the smaller sizes of gas engines are adequate.

Complete results of the survey are given in the 1940 Report and Gas Engine Census, published by the committee and available through the American Gas Association, 420 Lexington Avenue, New York City. The survey carefully omits from consideration all gas engines operated by the gas companies themselves, and all engines which are installed on a temporary basis only. Therefore, the conclusions reflect the general industrial acceptance of gas engines.

It is significant that 104 companies responded to the survey, as against 14 which answered similar queries in 1936. It was found that 56 of these natural gas companies are now serving gas for engine operation, to the tune of 12,392,398,000 cu. ft. consumed in 7998 engines developing 474,629 hp. for 4496 concerns, and resulting in an annual revenue to the 56 companies of $2,643,247. On a grand average, it was found that the average engine horsepower was 59; that 26,110 cu. ft. of gas were used per year per horsepower installed; and that annual gas company revenue was $5.57 per horsepower.

Roughly, 45% of all this gas engine business was served by eight natural gas companies who reported in 1936 as well as in 1940. Hence it was possible to gage the growth of industrial interest in gas engines as shown in Fig. 1. It will be noticed that, for these eight representative companies, the number of engines connected has risen 98.6%, the number of accounts 68.1%, the total connected horsepower 40.8%, and the annual revenue to the gas industry 89.6%. The average horsepower per engine has dropped from 73 to 51.8, showing that most of the new gas engine installations have been in the smaller sizes.

This year 22 engine manufacturers reported producing models for natural gas fueling, a record number. The committee notes in this connection: "While many of these manufacturers have been in the business of manufacturing gas engines for many years, a large number are newcomers to the field. It is particularly significant that many of the manufacturers listed were originally Diesel engine makers exclusively, and have only recently realized the potentialities of gas engine business."

SALES Slants

For CP Salesmen: Cash, Trips

MORE than 800 cash prizes will be given to leading utility and dealer CP gas range salesmen in nation-wide sales contests to be conducted by the American Gas Association in 1941. In addition, top sales producers can win one of seven all-expense trips to the A.G.A. Convention at Atlantic City in October. Awards to gas companies for outstanding CP sales performance have also been announced by George L. Scofield, chairman of the A.G.A. Domestic Range Committee. The CP Ranger Club is sponsored by A.G.A. Cash prizes are donated by the CP gas range manufacturers of the Association of Gas Appliance & Equipment Manufacturers.

Cash prize contests are open to all salesmen registered in the 1941 CP Ranger Club. The United States and Canada have been divided into seven Divisons and all contests will be on a divisional basis between salesmen from communities with approximately the same population and number of domestic gas meters in one, two, and three-family homes.

Contestants earn money rewards in three separate monthly contests, a quarterly competition and by becoming members of the 1941 CP Ranger Club. In monthly contests during March, April and May, a total of 168 cash amounts will be paid out, 56 each month to the salesmen, in each division, with the largest CP unit sales for the month. For highest total sales during this same three-month period, 140 prizes will be distributed to leading salesmen in each Division.

Cash for achieving membership is a new feature of the 1941 CP Ranger Club. $10 will be paid to every salesman who sells 25 CP models and becoming a CP Ranger and $15 more will be presented to every salesman who sells 50 CP's to become a Star Ranger.

The seven all-expense trips offered in addition to prize money will be won by salesmen, in each Division, with the largest number of CP installations from January 1 to August 31.

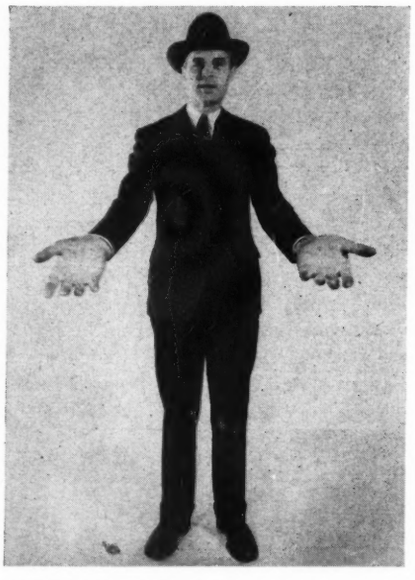
While salesmen are vying for cash prizes, gas companies will be competing for national honor trophies. In each of the seven Divisions, the gas company with the largest number of CP installations per 1000 one, two and three-family domestic gas meters, from January 2 to December 31, 1941, will receive a distinctive reward symbolic of the achievement. In addition, a National Best Performance Award is offered to gas companies for outstanding CP Gas Range promotions.

Additional information on details and rules of the contest may be obtained from CP Ranger Club, c/o American Gas Association, 420 Lexington Ave., New York, N. Y.

■ ■

All-Gas, Movie Star

We have just received from the American Gas Association a series of sheets on Metro-Goldwyn-Mayer's Pete Smith technicolor comedy short, "Penny to the Rescue," which was released about January 25. Prudence Penny, who is the star of this film, is a nationally-known home economist and her supporting cast includes the CP gas range, a gas refrigerator and a group of personable males. The picture, according to the release, is the best all-gas M-G-M short produced to date and there are plenty of close-up action shots of the range and refrigerator.



"GIMME" JIMMY . . .

would be on top of list if they'd only . . . "Gimme somethin' to sell, a better price, more advertising, or if prospects would only 'gimme' a break." Before long he'll probably be going around saying, "Gimme a job!"

American Gas Association makes several suggestions as to what to do about this film. One of these is to contact local theatre managers where the picture is being shown. He has plenty of photographs and is anxious to cooperate with the gas utility. Another is to convert regularly scheduled newspaper advertising space into special tie-in advertising, featuring the picture. Newspaper mats are available. There are other things you can do, too—get your dealer to tie-in with advertising and displays, contact your local newspaper and let them build a special promotion around the film, cooperate with the theatre in staking lobby displays and, of course, use all the material available for your own floor and show card displays.

■ ■

Second Lap

Bernard T. Franck, chairman of the American Gas Association Refrigeration Committee, has sent out word that registrations in the 1940-41 refrigeration campaign have reached a new high, as the campaign swings into its second quarter period under the slogan "The Challenge of Opportunity." Mr. Franck has announced also that beginning with January 1, nine new classifications of competition were added to the campaign, making a total of 35 classifications in six divisions in which companies can compete for the awards. The new classifications are sub-sections for greatest total installations in four of the campaign's six divisions with Divisions 1 and 6 remaining unchanged.

At this writing, 35 trophies have been distributed to gas companies throughout the country in recognition of gas refrigerator sales. This trophy, standing 21 inches high, is composed of three marching figures representing the scientist, factory worker and salesman. The figures, cast in bronze and nickel plated, stand on an eight-inch base of ebonized wood.

■ ■

Three Campaigns

After seeing what we've seen this month, we say that no one can ever accuse the Geo. D. Roper Corp. of being uncooperative in a sales way.

Carefully catalogued in a large indexed folder are the plans and samples of every device known to advertising for Roper's three complete gas range sales campaigns. The first of these cam-

"RABBIT-EARS" ELMER . . .

soaks up all the hard luck stories prospects pass out. Just let someone even whisper that business is bad, and Elmer is all ears. The only thing he can't hear is his name when they call off the leaders . . . it isn't there!*

paigns is being carried on under the banner "Let Freedom Ring" and is described as "a potent eye-appeal and mind catching for Mrs. Homemaker and her busy husband, too." The second campaign is the "Staggered Top" promotion plan in which Roper plays up the sales features of its exclusive "Staggered Top" feature. A "Staggered Top," in case you didn't know, consists of staggering the burners across the full width of the range so (1) no reaching over and around; (2) no hot handles, burned wrists; (3) full top can be used; (4) holds four large utensils at once. The third campaign is entitled "Demonstration Days," and Roper advises its sales outlets to tell a simple story, to "invite passers-by to look, listen, and learn," about the Roper ranges.

In addition to the indexed folder, we received three beautifully printed catalogues. The first of these is addressed to the home-maker, and tells her what she should look for in purchasing a new range. The other two catalogues are devoted to description and illustration of Ropers' various models, Catalogue D being for its regular line of gas ranges and Catalogue E for its CP models.

■ ■

Water Heater Campaign

For the first time, the Master Plumber Association of Northern California will conduct, during February and March, a special campaign to encourage the installation of new gas water heaters. A $10 allowance will be given on all old heaters turned in on a new one, of which allowance the distributor will pay $2, the Pacific Gas and Electric Co. will pay $2.50 and the installing plumber $5.50.

In addition, a special advertising campaign will be conducted to which each distributor will contribute $1 and the Plumbers will contribute $1 each. Regional meetings have been held during January to work out details of the campaign.

■ ■

He Worked at Lunch

Here is a story of an enterprising salesman who did his best work on his lunch hour, using not only his head but also his stomach. It seems that a certain Magic Chef salesman about a year ago tackled a city of some 140,000 meters where none of his company's heavy duty equipment had been sold. Against the utility company and equipment dealers, who were seemingly satisfied with the lines they were handling, he made little headway.

Using his head, the salesman thought of his stomach. During his noon hour he would have his soup in one restaurant, his main course in another, his dessert and coffee in still a third. Now, a restaurant man must be courteous to his customers and if you praise his food a bit, he is usually willing to spend a little time with you, at least long enough to make an appointment for later in the day. On his first call our salesman offered to make an analysis of each restaurant's kitchen problem. In short order, the salesman had uncovered a few sales, turned them over to dealers. A year and a half later seven dealers had fallen into line and 127 units had been installed in hotels, hospitals, restaurants and schools.

DOTTED LINE ROSCOE · By Bob Crosby

"Our kitchen planning department will be glad to design something in the 'U' type, complete with built-in nook and spice cabinets."

*Photographs of "Gimme" Jimmy and "Rabbit-Ears" Elmer through courtesy of Belnap & Thompson, Inc., Chicago sales promotion agency.

"Closet" Unit Clicks in Dallas

By J. M. LYNN, JR. Sales Supervisor, Dallas Gas Company

IN Dallas Gas Company territory a majority of the homes are heated with open fire heaters, and for several years most of our heating activity has centered around the promotion of vented individual appliances. However, when the manufacturers produced a compact winter air conditioning unit, complete with blower, filters, humidifiers, and automatic in every respect, the company decided to push the sale of these units. In order to arrive at a workable method of promotion, it was necessary to know the public's reaction to winter air conditioning, what the market was, what price homes afforded the largest possibilities and what the dealers were doing and could do.

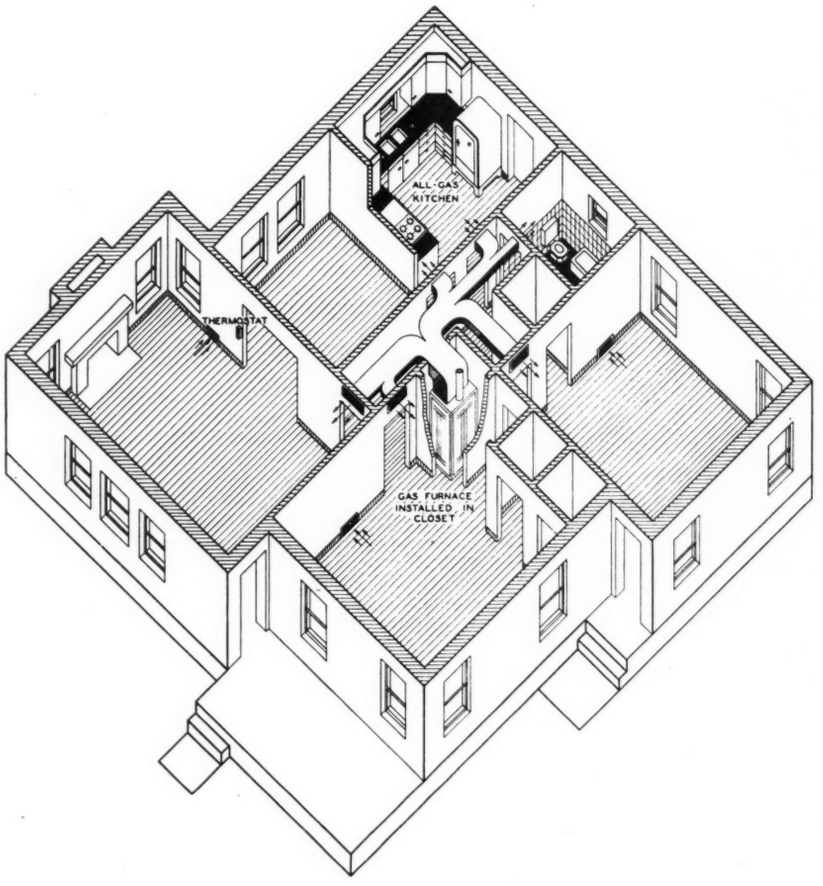
The average home owner or builder thinks of winter air conditioning in terms of $35 or $40 monthly gas bills. The initial cost of the equipment is secondary. To the public the highest monthly gas bill for the winter often becomes the average monthly gas bill for heating. The cost of cooking and water heating is not excluded, nor does the public figure in the comparatively low bills of early fall and spring. The oil user, on the other hand, often states that he uses so many gallons of oil per month for heating, and he does not add his cooking, water heating, bathroom heaters, fireplace heaters, electric cost of the blower or service charges to his overall heating cost. This general attitude of the public puts gas winter air conditioning in an unfavorable position, particularly with respect to oil competition.

During the last three years we have made the public more heating conscious through our "Heat for Health" Campaign and the installation of thousands of pieces of vented equipment. The public, as well as the contractors and promotional builders in our territory, are now "wall sweat" conscious, and as a result, the vented is gradually replacing the unvented gas equipment. It is our opinion that the swing to vented individual appliances is going too far, as many $10,000, $12,000 and $15,000 homes are using them for heating.

In the latter part of June, 1938, the Real Estate Board sponsored a three-day National Home Show in Dallas. We took three booths and displayed a model all-gas kitchen with a complete installation of a winter air conditioning unit. On the wall in full view were several blueprints of actual floor plans showing the location of the unit in the hall closet and the short run duct lines. Next to these were tacked eight or ten actual gas bills of homes using plants of this type. We broke these bills down on a per room per season basis in order to make them applicable to any size home. Above the unit was placed a sign showing the average installation cost in a five-, six-, and seven-room home.

Approximately 800 people, including architects, builders, home owners, and prospective home owners saw the unit. We secured about 50 live prospects which were referred to every dealer in the city. Many promotional builders were interested in these units because of the definite sales appeal, coupled with the fact that the monthly payments would only be increased about $2 over vented individual appliances.

In demonstrating the winter air conditioning unit at the Home Show we



This sketch illustrates a simple and inexpensive method of installing a "closet" type furnace. It can be located in a closet, garage, kitchen, or on the service porch. No basement is required. The heating unit supplies warmed air, filtered of all dust, with the correct amount of moisture added, to the registers located in each room. Room temperatures are automatically maintained at the correct healthful temperature by means of a thermostat.

The silent blower pulls chilled air from the floor of each room back to the furnace where it is mixed with fresh air, cleaned, warmed and recirculated to the rooms. This system provides healthful winter air conditioning for every room of the house with the additional advantage of individual room control of warm air registers if for any reason heat is not desired in some room of the home. The operating cost is surprisingly low.

FIG. 1. Typical Closet Type Heating Installation.

discovered that the term "winter air conditioning plant" or "central heating plant" was too expensive sounding for the lower bracket home buyer. Therefore, we have used the term "closet unit," which designates the probable location and the fact that a basement is not required. The term also implies that the unit can be located in small places which would represent small initial cost. The term "closet unit" clicked in our territory.

We compiled a survey from the Dodge Reports, a subscribed construction service, for the entire year of 1937 and 6½ months of 1938. We have since brought this up to include all of 1938 and all of 1939. This survey was compiled from homes varying in cost from $2500 through $3000, $4000, $5000 and $6000, and on up to $15,000 and over. This survey designated whether these homes were promotional sales houses or "owner occupied" and specified the method of heating; whether space heaters, floor furnaces, radiators, circulators, or central heating plants.

Our survey discloses that homes in the $4000, $5000 and $6000 brackets represented 51% of the homes built in 1937, 52% of the homes built in 1938, and approximately 50% of the homes built in 1939. Homes costing $7000 or above averaged approximately 18% over the three-year period. The homes below $4000, making up a total of 30% of the homes built, did not afford a market for closet type units.

Therefore, we spent our promotional efforts upon homes in the $4000, $5000 and $6000 bracket, or the 50% classification. We desired to make this promotion entirely through dealers, soliciting their cooperation rather than going into the sale of the "closet" type heaters ourselves. Our reasons for promotioning this middle classification were three:

1. If we could interest the small home in the idea of "closet" type heating we could go a long way toward eliminating the primary objection in the public's mind of high gas bills amounting to $35 and $40 per month.
2. It would show very definitely that the installation cost would be low compared to the public's idea of this cost.
3. If we could put "closet" type units in this low bracket, we would have a very definite sales appeal and leverage to use on homes in the higher bracket. In this we brought out the fact that if the man in the $4000 house could afford to pay the gas bills and installation costs, the man in the $10,000 house should most certainly have a unit installed. The first unit that was installed was placed in a home that sold for $4950.

Left to Right: Chester Young, J. M. Lynn, Jr., Grady Calvert, and O. A. Kinzer, all of the house heating promotion department of the Dallas Gas Co.

As part of the original promotion program, we prepared the sketch (Fig. 1) which gives an isometric view of a typical "closet" type heating unit in a five-room house. The reason this floor plan was chosen was that it is a representative floor plan of the $4000, $5000 and $6000 home market. The sketch was mailed to every new home owner reported in the Dodge Bulletins, to dealer salesmen, to architects, and to promotional builders. Our own new construction man carries this sketch in his sales portfolio.

Our program has been inexpensive, but has accomplished what we feel are very gratifying results, considering that in 1937 there were only 30 central heating plants specified in the Dodge reports, and the actual installations for that period were probably in the neighborhood of 45 to 50.

In the first 6½ months of 1938, only 42 "closet" type units were specified, and residential building increased 90% over the same period in 1937. It was in September, 1938, that we actively started our promotion. In the next six months period, our dealers installed or contracted to install almost as many units as were specified in all of 1937 and in the first of 1938. From September, 1938, to September, 1939, the dealers installed 217 "closet" type heating plants, and they are now averaging between 25 and 30 units per month, or possibly better.

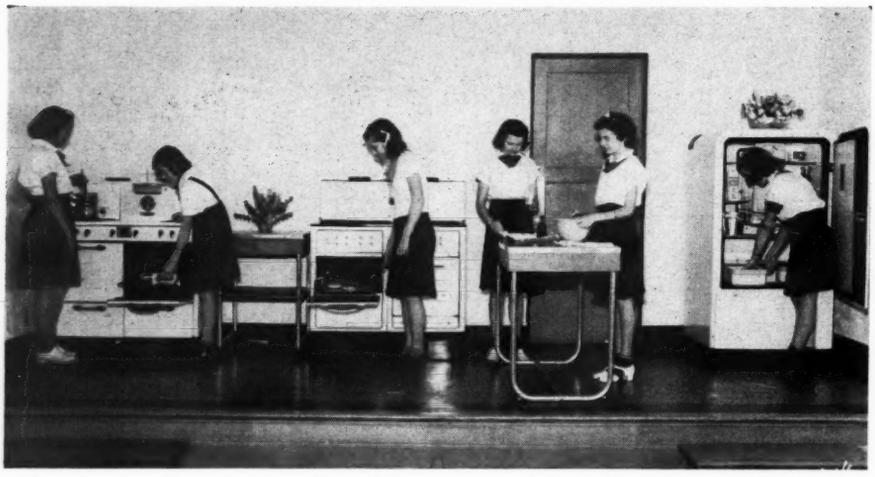
G. C. Calvert, C. C. Young, O. A. Kinzer and the writer have carried forward the work of promoting the sale of "closet" type units through personal calls upon architects, promotional builders, home owners, and dealers. We have a builder who has installed 27 "closet" type units in the last 27 homes he has built.

This is possible because these "closet" type units take his homes out of the competitive class. He offers them a twelve-month home comfort instead of a seven-month comfort, and the operating cost of the units will be approximately $10 per room per heating season, which approximates the cost with individually vented gas appliances. The builder is also able to point out to the prospect that through F.H.A. financing the home with the "closet" type units cost only from $3 to $4 per month more than the home without the unit.

Throughout the entire period of 1½ years we have continued to send out to architects every two months or so the original sketch of the five-room home utilizing "closet" type heating together with a pamphlet, "Helpful Venting Suggestions." This has kept the program constantly before interested parties. After a promotional builder installs a "closet" type unit, we prepare a framed sketch which is placed on the living room mantel so the builder can show prospective buyers how the units are installed at low operating cost.

One of our strongest closing points in getting promotional builders to install one of these units is to have him visualize what a difficult position he would be facing if he had to try to sell his house without a "closet" type unit in it at $42 per month payment against a competitive builder one block away who sold his home *with* a "closet" type unit emphasizing the advantages of year-'round comfort, low cost operation, etc., for a competitive cost of $45 or $46 per month payment.

In one case "closet" type heating has been sold to "The Southern," a two-bedroom, eight-apartment building. This apartment uses gas throughout for cooking, water heating, refrigeration, and heating. In the installation, each tenant can have any temperature desired as each apartment is equipped with a separate thermostatically controlled unit, thereby satisfying each tenant's individual desires for heating. In the month of February, 1940, one of the coldest months seen in Dallas in many years, the total gas bill for the "four big jobs" was $67.68.



These camp fire girls discover that gas is a boon to the busy housewife as they learn how to cook in the training kitchen at the Southern California Gas Co.'s auditorium.

Homemakers of Tomorrow Study Gas

THE Camp Fire Girls of America have explored the mysteries of gas this year as part of a nation-wide investigation of how a city keeps house. Through tours, interviews with gas company officials and workmen, and other research, these homemakers of tomorrow have unearthed interesting facts about the gas supply in their own towns.

A knowledge of how the gas supply functions will enable the girls to make better use of it themselves and to understand their job as cititzens to help make it more efficient for everyone. Local officials throughout the U. S. are enthusiastic in their praise of the way in which these young people tackled the project. J. I. Hennessy, personnel examiner of the East Bay Municipal Utility District in Oakland, Calif., expressed his approval by remarking: "If only more of the coming generation would interest themselves in these things, a number of the ills that beset the country today would soon eliminate themselves because of the intelligent understanding of community problems that would result."

In attacking the gas problem the youngsters sought to answer such questions as: Where does the gas come from? How is it distributed? When and how was it originated as a Utility? Who controls it? How long will the supply last? How is it measured and charged for? Further investigation revealed many ways in which gas makes life safer and more comfortable for each girl. Dangers in the unwise use of gas were carefully noted by the girls, who also inquired into special provisions for such emergencies as floods and fires.

After learning how to read a gas meter, the girls felt that every housewife should master this technique in order to know whether she is really getting the finest service possible. The young inspectors found out how they can use gas so as not to waste it and still have maximum efficiency. In each community they considered whether the production and use of gas tended to add to or detract from the natural resources.

During the extreme cold of the past winter the Sherman, Texas, Camp Fire Girls had an excellent chance to test the value of an emergency gas crew. With the greatest demand for gas in 30 years, the gas dispatchers in Dallas were at their posts constantly. They were connected with far-flung gas fields and compressor stations giving orders to step up pressures and cut in more wells. The system stood the test of peak demand in spite of prolonged cold, earning the special thanks of the Camp Fire Girls who could now understand for the first time what problems were involved.

The Sherman group visited the Gas company and posed for pictures while they learned to use the different appliances. At the end of a final report on their gas supply, the girls wrote with pride:

"Gas makes life safer and more pleasant for us in Texas by eliminating all smoke from the air and from our buildings, making our cities much cleaner. Texans feel very proud of their abundance of natural gas when they visit northern cities, which must use coal and have the smoke and dirt connected with this fuel. Gas also provides a cheap and quick method of cooking and heating our homes, besides all its other uses.

"Now that we have learned more about our gas we think of it, not just as something we naturally have, but as something we should always be proud of and use to the best advantage of everyone."

■ ■

Home Service Conference Held by Gas Service Co.

MEMBERS of the home service department of the Gas Service Co., Kansas City Gas Co. and Wyandotte County Gas Co., Kansas City, held their annual two-day conference in that city recently. The program consisted of visual demonstrations and presentations by outstanding women in a variety of fields from various sections of the country.

The meeting was in charge of F. M. Rosenkrans, general company new business manager. Mr. Rosenkrans, in opening the meeting, reviewed the progress that has been made by the department in past years and particularly in 1940. He outlined the program that will be followed by the department in 1941.

Those who appeared on the program were: Jane Tiffany Wagner, director of home economics, Servel, Inc., Evansville, Ind. Alma C. Swenson, midwestern field representative, Wheat Flour Institute, Chicago. Elizabeth Lynahan, home service supervisor, Peoples' Gas, Light and Coke Co., Chicago. Albertine Berry, home service director, Lone Star Gas Co., Dallas, and chairman of the home service committee, American Gas Association. Florence C. Plondke, department of home economics, National Livestock and Meat Board, Chicago. Jessie McQueen, home service councellor, American Gas Association, New York.

■ ■

Model Housing Project Uses Gas Extensively

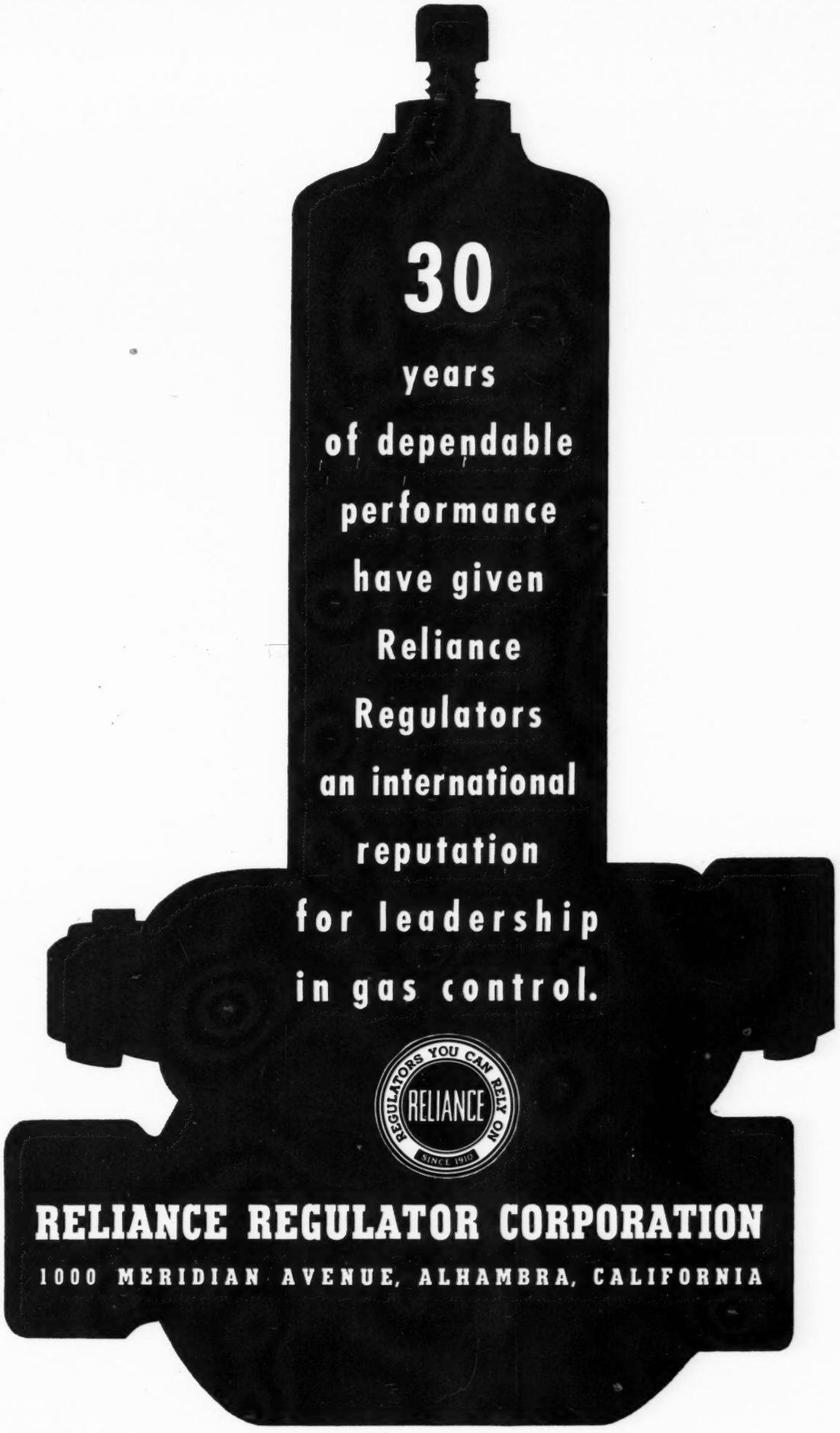
Indicative of the trend to gas, a new housing development adjacent to the city of Tacoma, Wash., has selected the fuel to perform its cooking, water heating and house heating operations. The eleven new homes, situated in the Lakewood district, and embodying every new architectural feature, each contain a utility room in which is installed the automatic gas furnace and water heater. No basement was needed. Wedgewood CP gas ranges were chosen for all kitchens, and Payne forced-air heating units also were used exclusively.

■ ■

Brooklyn Appliance Sales Top 30,000 in Ten Months

According to a recent announcement by the Brooklyn Union Gas Co., New York, more than 30,000 modern approved gas ranges, refrigerators, water heaters and house heaters were purchased during the first ten months of last year by persons living in the company's territory.

The report shows that ranges alone accounted for nearly 9,000 sales, while refrigerator deliveries topped the 16,000 mark to reach 16,577, water heater sales numbered 2,822, and house heater sales were 1,788.


30
years
of dependable
performance
have given
Reliance
Regulators
an international
reputation
for leadership
in gas control.
REGULATORS YOU CAN RELY ON
RELIANCE
SINCE 1910
RELIANCE REGULATOR CORPORATION
1000 MERIDIAN AVENUE, ALHAMBRA, CALIFORNIA

ASSOCIATION *Activities*

S. G. A. Holds Annual Meeting

THE annual convention of the Southern Gas Association will be held in Dallas, Tex., at Hotel Adolphus, February 10-12, with hundreds of gas industry representatives from the south and southwest expected to attend. Sales will be the general theme of the three-day meeting, which will hear talks on residential sales, industrial sales, home service, technical discussions on employe training, customer relations, advertising, and the industry's responsibility in the National Defense Program.

Starting at 10 a.m., general sessions will be presided over by President C. B. Wilson of Little Rock, Ark. Technical and sales conferences will start at 2 p.m., with C. L. Osterberger of New Orleans, La.; H. N. Oldham, Carlsbad, N. M., and W. H. Ligon, Atlanta, Ga., presiding.

After the call to order by President Wilson, Frank R. Schneider, supervisor of public utilities for Dallas, is on the program to welcome the delegates. Principal speaker at the initial session will be D. A. Hulcy of Dallas, president of the Lone Star Gas Co., his subject being "This Industry of Ours." Mr. Wilson will report on the state of the industry in S.G.A. territory, and Chairman Carl Wolf of Atlanta, Ga., will give a report of the committee to promote business progress.

High-lighting the general session on February 11 will be a home service program over which Chairman Fannie May Izard of Jackson, Miss., will preside. Greetings will come from Albertine Berry of Dallas, home service chairman of the American Gas Association. Nell Read of San Antonio, Tex., will discuss "Home Service Looks to the Future." A questionnaire on "Reaching the Customer—Present and Future" will be presented by R. E. Sivley of San Antonio, with answers by Grace Larrabee of New Orleans, Alice Livermore of Houston, Lucie Lee Carley of Fort Worth, Tex., and Cephalie Lewis of Atlanta. A skit, "Water Heating and House Heating," will be given by members of the Oklahoma Natural Gas Co. home service department, with introductions by Sara Garrison.

L. G. Waskom, industrial engineer for The Dallas Gas Co., will conduct an industrial gas inspection trip for the visitors on the morning of February 11.

Reports from committees and election of officers and directors are scheduled for the final general session on February 12. Chief speaker will be Major T. J. Strickler of New York, president of the American Gas Association. His subject is "Advertising in the Gas Industry." Frank C. Smith of Houston, president of the Houston Natural Gas Co., will speak on "Institute of Gas Technology."

Colonel Albert Sidney Johnson of Dallas, president of the Southern Union Gas Co., will address the sales conference luncheon, closing event of the convention. C. L. Osterberger of New Orleans, will preside.

The convention entertainment highlight will be the President's Ball at 7:30 p.m. on February 11. Cabaret style, it will be held in the Main Ball Room of Hotel Adolphus. This will be preceded by a smoker in the Palm Garden of the hotel, and a luncheon for the ladies in the Hawaiian Room, followed by a style show by A. Harris and Company. Delegates who golf may play as guests of the country club.

The official personnel of the Southern Gas Association includes President Wilson, Carl Wolf of Atlanta, first vice president; L. B. Denning Jr., of Dallas, second vice president, and L. L. Baxter of Fayetteville, Ark., secretary-treasurer, and the following directors: W. L. Plummer of Atlanta; C. P. Rather of Birmingham, Ala.; A. M. Spencer of Columbus, Ga.; J. H. Warden of Tulsa, Okla.; W. J. Amos of New Orleans; E. C. Jouillian of Oklahoma City; Frank C. Smith of Houston, and C. B. Seidenglaz of Dallas.

■ ■

Mid-West Gas Conference Scheduled for This Month

The 1941 Mid-West Regional Gas Sales Conference will be held on February 17 and 18, at the Edgewater Beach Hotel, Chicago, Ill. The program will be built around the "Four Big Jobs," treating each in an informative and interesting manner. A unique addition to the program will be an informal dinner and gala entertainment on Monday night in the Marine dining room of the hotel. To quote Elliott G. Peabody, chairman of the conference, "This year's conference will offer more to the sales personnel of the mid-western gas utilities than can be obtained anywhere else."

CALENDAR

February

Southern Gas Association — Annual Meeting and Gas Sales Conference, Hotel Adolphus, Dallas, Texas, February 10-12.

New England Gas Association—Industrial Division Meeting, Worcester, Mass., February 14.

A. G. A. Mid-West Regional Gas Sales Conference—Chicago, Ill., February 17-18.

New England Gas Association—Accounting Division, Boston, Mass., February 20.

New England Gas Association—Sales Manager's Conference and Manufacturers Division, University Club, Boston, Mass., February 28.

March

Spring Sales Conference, Pacific Coast Gas Association — Los Angeles, Calif., March 6-7.

A.G.A. Conference, Industrial Gas Sales—Lord Baltimore Hotel, Baltimore, Md., March 13-14.

Oklahoma Utilities Association—Tulsa, Okla., March 17-18.

New England Gas Association—Hotel Statler, Boston, Mass., March 27-28.

Spring Technical Conference, Pacific Coast Gas Association — Los Angeles, Calif., March 27-28.

April

American Society of Chemical Engineers—Atlanta, Ga., April 1-3.

Mid-West Gas Association—Hotel Nicollet, Minneapolis, Minn., April 14-16.

Southwestern Gas Measurement Short Course—College of Engineering, University of Oklahoma, Norman, Okla., April 15-17.

Gas Meters Association of Florida and South Georgia—Hollywood, Fla., April 21-22.

A.G.A. Distribution Conference—Pittsburgh, Pa., April 21-23.

Missouri Association of Public Utilities—Elms Hotel, Excelsior Springs, Mo., April 23-25.

A.G.A. Hotel, Restaurant and Commercial Sales Conference—Palmer House, Chicago, Ill., April 24-25.

May

A.G.A. Convention, Natural Gas Section—Dallas, Texas, May 5-8.

National Metal Trades Association—Palmer House, Chicago, Ill., May 8-9.

Pennsylvania Gas Association—Skytop, Pa., May 12-14.

A.G.A. Production and Chemical Conference—New York, N. Y., May 19-21.

Canadian Gas Association—Hamilton, Ontario, May 20-21.

Natural Gas and Petroleum Association of Canada—Hamilton, Ontario, May 22-23.

June

Association of Gas Appliance and Equipment Manufacturers — Ambassador Hotel, Los Angeles, Calif., June 3-5.

Pacific Heating and Air Conditioning Exposition—San Francisco, Calif., June 16-20.

Michigan Gas Association—Grand Hotel, Mackinac Island, Mich., June 30, July 1 and 2.

September

Mid-West Gas School and Conference—Ames, Iowa, September 8-10.

Annual Convention, Pacific Coast Gas Association—Del Monte, Calif., exact date not yet set.

October

23rd Annual Convention, American Gas Association—Atlantic City, N. J., the week of October 20, 1941.

Natural Gas Section Plans Laid for Meeting in May

ON January 6 the following Natural Gas Section committees met in St. Louis, Mo.: Executive and Managing Committees; Accident Prevention Sub-committee; Industrial and Commercial Gas Sales Committee; Main Technical and Research Committee; General Program Committee.

One of the most important matters discussed at the meetings was the program for the Natural Gas Convention to be held on May 5, 6, and 7 in Hotel Adolphus and the Baker Hotel, Dallas, Texas. The program for this 36th annual natural gas meeting has been fully outlined and, from the subjects and speakers selected for the various sessions and conferences, the natural gas man can be assured that his three days in Dallas will be packed with interesting and recent information on trends in the natural gas industry. It is again planned to use the symposium for subject presentation, since this method guarantees a complete and open discussion of problems which face the operating man.

Speakers of national reputation in research, advertising, etc., are scheduled for the 1941 program. More detailed information about the program will be released at a later date. Because of last year's record attendance in Houston and the interest already evidenced in the 1941 meeting, you are advised to make hotel reservations early. If you have not already received a hotel reservation blank, write to E. H. Poe, secretary, Natural Gas Section, A. G. A., New York, N. Y.

■ ■

Plans Being Formed for Heating Exposition

Plans for the Pacific Heating and Air Conditioning Exposition to be held in San Francisco, June 16 to 20, are rapidly crystallizing. Wm. H. Relyea, Jr., Exposition representative, is now in that city and reports that while the first day will be reserved for the trade, during the remaining four days provision will be made for that portion of the general public which is actively interested in heating and air conditioning equipment to attend the Exposition. The Pacific Gas and Electric Co. has reserved some 200 sq. ft. for a general presentation of gas heating and is also contemplating the issuance of tickets to customers in the Bay area, supported by newspaper advertising and publicity. About 60 firms have so far reserved space, among them being Pacific Gas Radiator Co., H. R. Basford Co., Payne Furnace and Supply Co., Electrogas Furnace Co., Fraser & Johnston, The Heating Equipment Co., Atlas Heating & Ventilating Co., General Controls, and Utility Fan Co.

■ ■

Plans for Gas Measurement Short Course Laid

At a meeting of the general committee of the Southwestern Gas Measurement Short course held at Norman, Okla., January 17, the program was arranged for the 1941 short course to be held at Norman, Okla., April 15, 16 and 17. This was the second meeting of the 1941 committee of which R. L. Rountree, United Gas Pipe Line Co., Shreveport, La., is chairman. The first was held at Dallas, Texas, in November, last year.

The short course is sponsored annually by the College of Engineering, University of Oklahoma, assisted by the Oklahoma Utilities Association and other organizations.

The Municipal Auditorium will again be the scene of the gas appliance, accessories and equipment exhibit to be held by the Association of Gas Appliance and Equipment Manufacturers during the week of October 20, 1941, in Atlantic City, N. J., concurrently with the A. G. A.'s 23rd annual convention. The above photo shows the last national exhibit held in October, 1936, in the Atlantic City auditorium.

Appliance Men to Exhibit Products

THE Association of Gas Appliance and Equipment Manufacturers will hold an exhibition of gas appliances, accessories and equipment in the Municipal Auditorium, Atlantic City, N. J., the week of October 20, 1941, it has been announced by W. E. Derwent, president of the association and vice president of the George D. Roper Corp., Rockford, Ill. The exhibit will be held concurrently with the American Gas Association's 23rd annual convention being held during the same week.

Due to the prominent display of gas appliances and equipment at the Gas Industries Building at the New York World's Fair and at the gas pavilion at the San Francisco Golden Gate International Exposition, other exhibits were not held while the fairs were in progress. This will be the first national exhibit of gas appliances since 1936 and, with an estimate of over 200 manufacturers participating.

The following are members of the exhibition committee: Lucian Kahn, chairman, Estate Stove Co., Hamilton, Ohio; H. P. Boncher, Dresser Manufacturing Co., Bradford, Pa.; W. S. Guitteau, Stacey Brothers Gas Construction Co., New York, N. Y.; F. J. Hoenigmann, Cribben & Sexton Co., Chicago, Ill.; George S. Jones, Jr., Servel, Inc., Evansville, Ind.; R. H. Lewis, Ruud Manufacturing Co., Pittsburgh, Pa.; Norton McKean, American Meter Co., Albany, N. Y.; H. T. Ryan, Robertshaw Thermostat Co., Youngwood, Pa.; R. E. Towne, Surface Combustion Corp., Toledo, Ohio.

■ ■

American Gas Association Sets Draftee Regulation

At its regular meeting on December 5 the executive board of the American Gas Association took the following action:

"The individual members of the American Gas Association who enter the Military or Naval forces of the United States will retain their membership without payment of dues for one year and forty days from the date of entry into service. All membership services will be supplied while members are on active duty."

It is important that the secretary of the Association be advised of the *exact date* on which a member reports for military or naval service and the camp or station to which he is assigned.

The member's name will then be placed on a *Special Roll* and his dues will be adjusted in accordance with the action of the executive board.

■ ■

California Meter Association Plans Annual "Hi-jinks"

The next monthly meeting of the Southern California Meter Association will be the occasion of their 14th annual "Hi-Jinks," to be held at the Brentwood Golf Club on February 15. Dinner and entertainment $2.50. Anatole Fomilyant, Pittsburgh Equitable Meter Co., is entertainment chairman.

The last meeting of the association, held January 16, featured an address, "Recent Improvements in Pilot Regulation," by E. M. Cloran, of the Pittsburgh Equitable Meter Co., and a "Sports Picture," furnished through courtesy of the Associated Oil Co.

Again IT'S ROPER

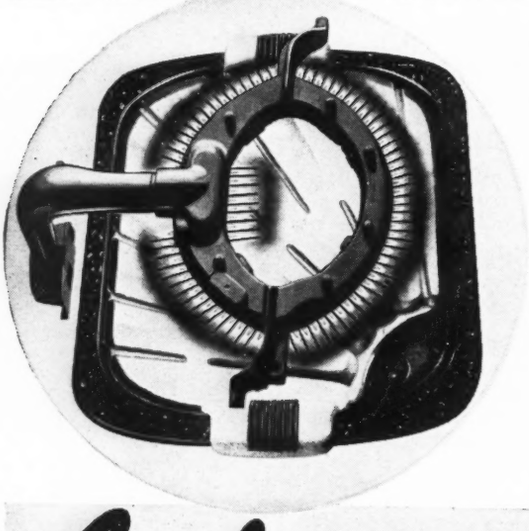
GAS RANGES

Out in front with product, with prestige and with sales plans that have no precedent for 56 years of leadership.

Again —Amazing new features that are unexcelled.

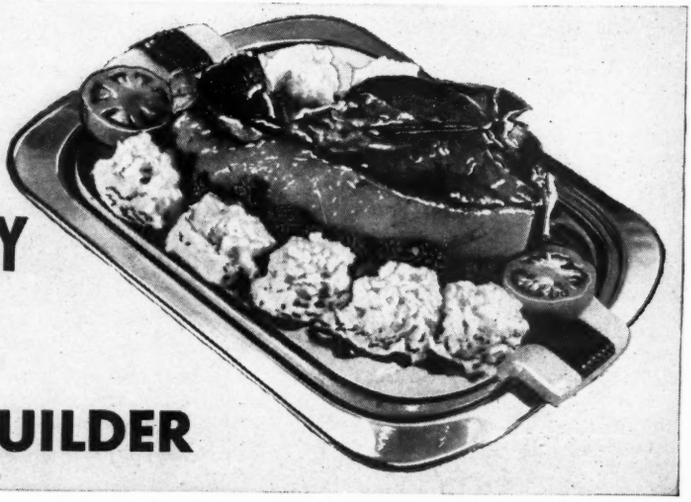
Again —National advertising and local campaign plans that will "click."

Now! PATENTED STAGGERED TOP
OFFERED IN MORE MODELS
3 YEARS' ACCEPTANCE PROVES IT OUTSTANDING

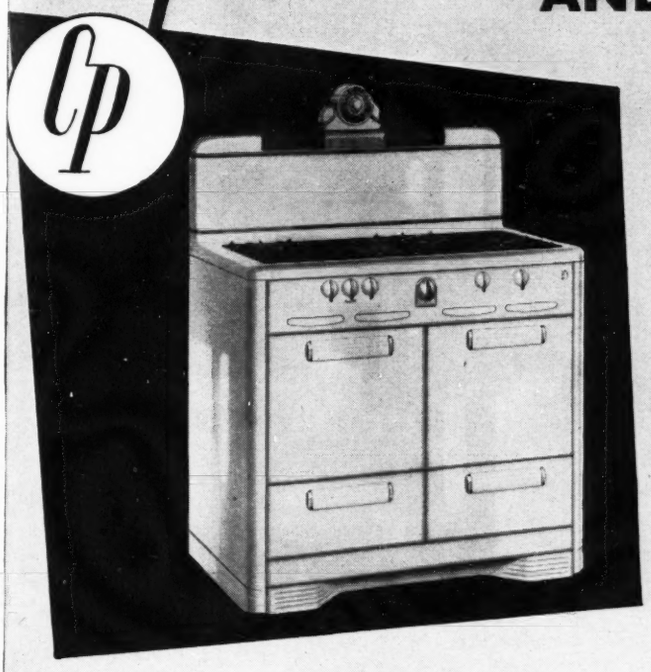


NOW *Something New*
"GLO" BROILER BURNER
UP TO 20% FASTER
(BROILS WITH "INFRA-RED" RAYS)

Again "PEASANT-WARE"
BROILER with SERVE TRAY
EXCLUSIVE!
A SURE-FIRE SALES BUILDER



Again THE MOST BEAUTIFUL AND MOST COMPLETE GAS RANGES IN AMERICA



More beautiful, more complete, more unusual and practical than ever before! Many ranges with (CP) seal of Certified Performance. Again it's Roper with more to offer.

BACKED BY *SMASHING NEW PROMOTION PLANS* THAT BUILD INCREASED SALES VOLUME

A Freedom Ring Sale. A Staggered Top Campaign. Demonstration Days Promotion. Many year 'round helps including novel displays, 4-color visualizer, colorful booklet, campaign folders. Complete plans all ready for you.

GEO. D. ROPER CORPORATION

GENERAL SALES OFFICE AND PLANT: ROCKFORD, ILLINOIS

Chicago: 343 S. Dearborn Street; Atlanta: 901 William Oliver Building; Los Angeles: 2481 Porter Street; Philadelphia: 401 N. Broad Street; Jersey City: 629 Grove Street; Dallas: Santa Fe Building, Second Unit; Houston: M & M Building; Cincinnati: 626 Broadway; Oakland: 500 Kirkham Street; Cleveland: 2053 East 105th Street; Kansas City; Boston; Washington; Roanoke; Pittsburgh; New York; Denver.

ROPER GAS RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS

Pacific Coast Gas Association Plans Spring Meetings

ACCORDING to O. R. Doerr, chairman of the Sales and Advertising Section, Pacific Coast Gas Association, the Annual Spring Sales Conference will be held in Los Angeles on Thursday and Friday, March 6 and 7. Although the program is not fully formulated, some portion of the time will be devoted to meetings of special groups, such as dealer contact men, new construction men, commercial and industrial sales engineers, and domestic promotion supervisors.

The annual Spring Technical Conference will be held in Los Angeles on March 27 and 28, according to C. P. de Jonge, chairman of the Technical Section. The program for this conference will consist of discussions on the newest methods in gas engineering under the leadership of the Section's Committee Chairmen: J. F. Sauer, Distribution; M. L. Fort, Production; H. P. George, Transportation; and John Mueller, Utilization.

■ ■

Industrial Gas Sales Conference for March

The American Gas Association Conference on Industrial Gas Sales is due this year at the Lord Baltimore Hotel, Baltimore, Md., Thursday and Friday, March 13 and 14.

Lawrence E. Biemiller, Consolidated Gas, Electric Light and Power Co. of Baltimore, chairman of the program committee for the A.G.A. Industrial and Commercial Gas Section, promises sales ideas, promotional help, research reports, utilization information, data on new developments and, of course, entertainment.

The whole schedule is listed under the banner slogan, "Speed Defense Production with Industrial Gas." Directly following this theme will be papers such as: "Uses of Gas in the Production of Munitions, Particularly Shells and Guns for Aerial Warfare," sponsored by the Section's Committee on Use of Gas in National Defense; and "Five-Minute Reports on Outstanding 1940-1941 Industrial Gas Equipment Developments," contributed by representatives from six leading industrial gas equipment manufacturing concerns.

■ ■

Oklahoma Utilities Plans Annual Convention

The convention committee of the Oklahoma Utilities Association met at Tulsa, January 9, and outlined the program for the two-day annual convention of the organization to be held at the Mayo Hotel, Tulsa, March 17 and 18.

In the absence of W. L. Woodward, Alva, chairman of the committee, R. K. Lane, Tulsa, president of the association presided at the committee meeting.

Kate A. Niblack, is secretary of the association.

■ ■

New England Gas Ass'n Holds Sales Meeting

At the recent meeting held by the sales division of the New England Gas Association, more than 450 executives and salesmen of New England utilities overflowed the Georgian Room of the Hotel Statler, Boston, Mass., to hear of the progress being made in the sale of gas refrigeration in connection with the American Gas Association Refrigeration Committee sales campaign, to view sound motion pictures carrying sales messages, and to hear leaders in the industry review activities.

New England sales representatives of utilities, salesmen from all parts of New England and representatives of Servel, Inc., were active in the program which included a lively "quiz contest" participated in by the New England men and women in attendance. Representatives of home service departments attended the afternoon session and the banquet in the Salle Moderne.

Robert Stuart, Jr., of the Blackstone Gas & Electric Co. of Pawtucket, R. I., chairman of the sales division of the New England association, presided as chairman at the main session.

Gardiner P. Bissell of Portland, Ore., $250 first prize winner in the national amateur photographic kitchen contest sponsored by the American Gas Association. His winning photograph showed the all-gas kitchen of Life House No. 1 for 1940, built as an all-gas-equipped exhibition home at Lake Oswego, Oswego, Ore., near Portland. It is owned by Miss Margaret Castlio.

■ ■

P.C.G.A. Plans Women's Essay Contest For 1941

The Pacific Coast Gas Association has donated $50 to be given as prizes in a Women's Committee Essay Contest during 1941. The contest is designed to promote individual development and expression; to reveal hidden talents among members; to create enthusiasm in the women's committee program; and to give the women's committee added publicity.

A first prize of $25, a second of $15 and a third of $10 will be given, and will be announced at the 1941 Gas Convention in the fall. Essays will be submitted under the general title "It's All in the Day's Work," and will be limited to not more than 700 words.

■ ■

Expansion in San Diego

San Diego's aircraft and national defense base expansion will require a $6,000,000 increase in service equipment of the San Diego Gas and Electric Co., William F. Raber, president, reported recently.

Greetings!

SOUTHERN GAS ASSOCIATION

We feel that each convention marks another milestone of progress in the Association's efforts to better serve the people and industries of this country.

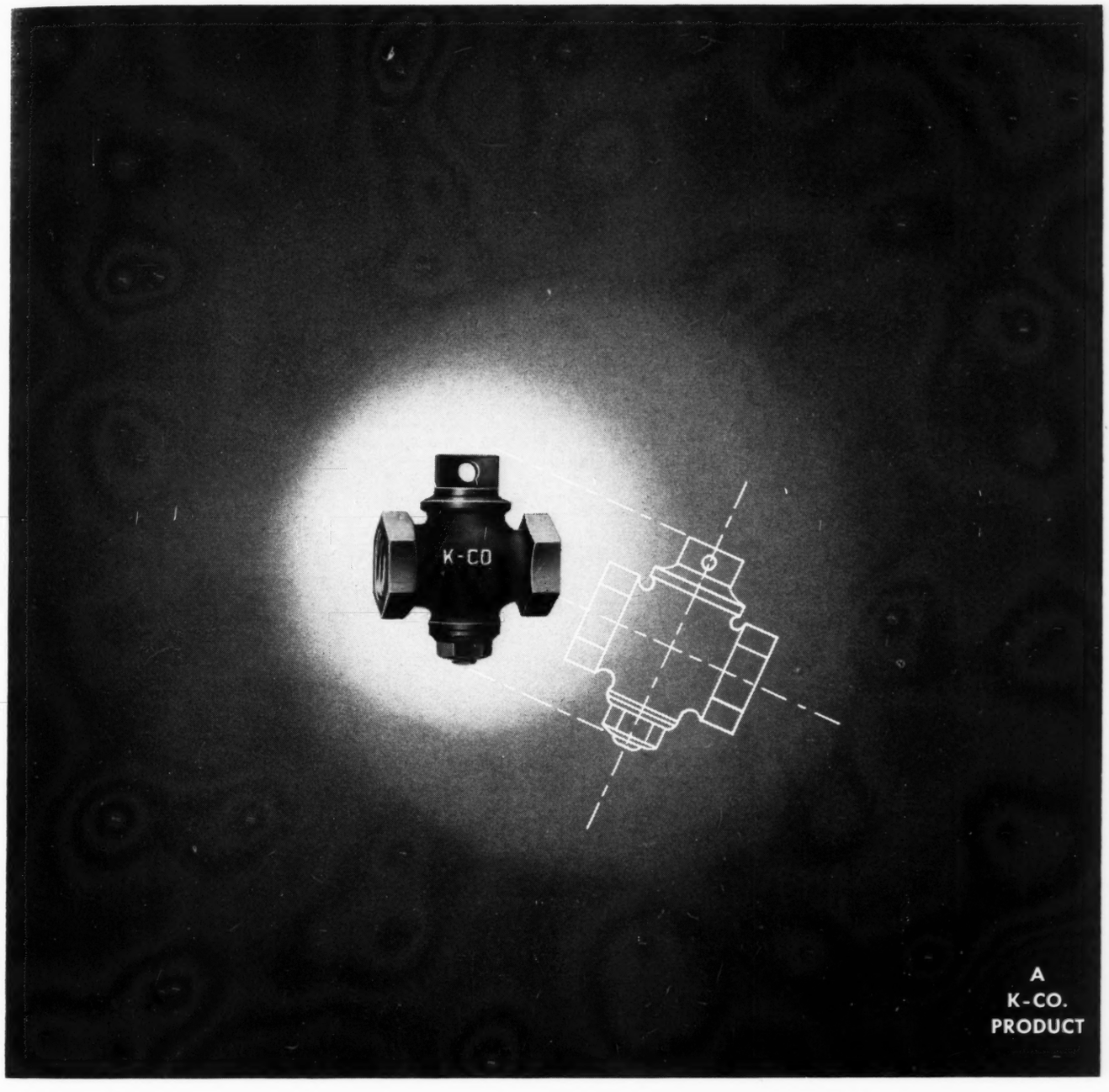
For a number of years it has been our privilege to cooperate with many of you in the solving of combustion problems. Therefore, it is a source of satisfaction to know that ours has been a contribution to the Industry.

THE WEBSTER ENGINEERING COMPANY

TULSA *Division of* **OKLAHOMA**

SURFACE COMBUSTION CORP., Toledo, Ohio

E. G. LANGHAMMER CO., San Antonio
F. J. EVANS ENGINEERING CO., Birmingham, Atlanta, and Houston
CATLETT ENGINEERS, INC., Dallas
F. P. FISCHER ENGINEERING CO., New Orleans



Doubles in Brass!

Precision tooling, accurate machining of every KITSON product duplicates, in the finest grade red brass, the mathematical accuracy of the working blueprint. KITSON quality further is guaranteed by test inspection covering ease of operation, freedom from leakage and general perfection of craftsmanship.

In effect, this gives you theoretical efficiency in maximum practical application . . . it assures you of always reliable fittings—performance faithfully mirroring the intent of the design.

The K-CO trade mark is the warranty of a fine product . . . is backed unconditionally by the

KITSON COMPANY, 1500 Walnut Street, Philadelphia, Pa.

KITSON

TRADE K-CO MARK

SAFETY CONTROLS for MANUAL and AUTOMATIC Water Heaters
QUALITY BRASS GOODS for GAS, WATER and all PLUMBING USES

Since 1897

INDUSTRY *Personalities*

• The resignation of **B. B. Williams** as president of The Cooper-Bessemer Corp., and election of **Charles B. Jahnke** as his successor, was announced recently, following a meeting of the corporation's board of directors in Mount Vernon, Ohio.

C. B. JAHNKE

Mr. Williams was made chairman of the board of directors, succeeding **Dr. E. J. Fithian** of Grove City, Pa., who resigned his position. The new chairman expects to continue in an active capacity as the head of the corporation. Mr. Jahnke, who has been vice president and general manager for the past two-and-a-half years, will act as president and general manager and will serve as a member of the executive committee. Dr. Fithian, one of the founders of the Bessemer Gas Engine Co., and its president for several years, will continue as a member of the board of directors.

Mr. Williams had considered resigning the presidency and nominating Jahnke as his successor at the corporation's annual meeting in March, but decided to act now because of the importance of national defense work being done by Cooper-Bessemer and the necessity of his being absent often from the company's main offices.

The new president has been with The Cooper-Bessemer Corp. since 1935, having served two-and-a-half years as chief engineer and since July, 1937, as vice president and general manager. He came to Cooper-Bessemer as a Diesel engineer, with an extensive background and training in engineering work with that type of engine.

• In order to aid in the expansion of increased activities, the Association of Gas Appliance and Equipment Manufacturers recently elected **Lyle C. Harvey** to the newly created post of second vice president, it was announced by **W. E. Derwent,** president of the Association.

Mr. Harvey, who is president and general manager of the Bryant Heater Co., Cleveland, Ohio, has been identified with the gas industry for the past two decades, particularly in the gas appliance field and is responsible for many innovations in the merchandising of gas heating and air conditioning appliances.

Mr. Harvey is also a director of the Dresser Manufacturing Co., Bradford, Pa., and is chairman of the Association's Committee on Laboratory Activities.

• The appointments of **C. T. Hapgood** and **R. C. Garvey** as assistant district sales managers at Los Angeles and San Francisco District Sales Offices, respectively, effective January 1, 1941, were announced by Jones & Laughlin Steel Corp., Pittsburgh.

Mr. Hapgood started his business career with Jones & Laughlin Steel Corp. as an inspector in the Aliquippa Tube Mills in 1930.

Mr. Garvey was associated with several Cleveland firms from 1919 to 1937, and came to Jones & Laughlin Steel Corp. in the Tubular Products Sales Department in 1937.

• **Chester C. Moore,** district manager for the Community Natural Gas Co., Dallas, Texas, in Frederick, Okla., was recently named as that community's most useful male citizen in 1940. Mr. Moore is active in Scouting activities, is a director in the Chamber of Commerce, and a member of the Lions Club and American Legion.

• **Bill Dalton,** who has been connected with the Arkansas Western Gas Co., Fayetteville, Ark., for the past 10 years, recently assumed new duties as manager of the Paris, Ark., division of that company. His new position was made possible by the purchase of the entire distribution system of the River Valley Gas Co. by Arkansas Western.

• **Lawrence C. Flath,** claim agent for the East Ohio Gas Co., Cleveland, recently retired after completing 38 years of service, being employed by East Ohio in 1902. In addition to being head of the claims department, Mr. Flath has administered the company's first annuities and benefits plan for employes which was started in 1918.

The Cleveland offices of the company also announced the retirement of **G. C. Lohr,** agent for the company in Warren, Ohio. Mr. Lohr has also given 38 years of service to East Ohio.

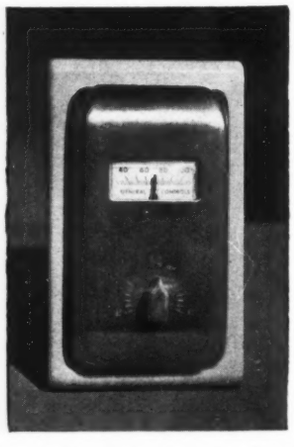
• According to a recent announcement by **Malcolm Leach,** vice president of the Glenwood Range Co., Taunton, Mass., **H. E. Nickerson** has been appointed sales manager of that concern, filling the vacancy left by the resignation of **W. A. McDonald** due to ill health. Mr. McDonald is now on vacation, and on return will take charge of one of the company's important sales territories.

• One of seven prominent Dallas, Texas, business men to be elected directors of the Dallas Chamber of Commerce for the coming year is **D. A. Hulcy,** president of the Lone Star Gas Co. Formal election and presentation of the new board was held recently at the annual membership meeting, attended by hundreds of civic-minded Dallas citizens.

• **Bertrom K. Dunshee** was lately made manager of the claims and safety division of the Pacific Gas and Electric Co., following the recent promotion of **Harry C. Ross,** who formerly held that position. Mr. Dunshee, an assistant engineer in the land department, joined the company in 1922.

TRIMTHERM

GENERAL CONTROLS THERMOSTAT OF TOMORROW



T-80 Series Thermostats for use with all B-60 Series Gas Heating Controls

SURFACE MOUNTING
With flush appearance; no recess in wall.

½° F. DIFFERENTIAL
Without false heat input.

UNOBTRUSIVE
Extends but 13/16" off the wall.

CORRECT DESIGN
Harmonizes with vertical walls.

PLASTIC BASE
Thermally isolates thermostat from wall.

VISIBLE MARKINGS
All calibrations easy to read.

KNOB ON COVER
No wall smear.

Described in the new 1941 Catalog. Write for your copy.

GENERAL CONTROLS

267 Fifth Ave., New York City
450 East Ohio St., Chicago, Ill.

Distributors and Stocks in all Principal Cities

Miss America

HAS A DATE WITH YOU!

IT won't be long now . . . till Miss America brings you important Magic Chef news. She headlines a parcel of news that's as smart and snappy as her picture.

AMERICAN BEAUTIES . . . new Magic Chef range models that will mark 1941 as a hit year in gas range history! Headliners in every price class.

SURPRISE PACKAGE . . . a smashing new promotion and merchandising campaign backed by more new national advertising. We've cooked up a practical, sales-minded campaign, decorated with showmanship, all ready for you to dish up to your public.

DON'T PLAN YOUR SPRING CAMPAIGN TILL YOU SEE YOUR MAGIC CHEF MAN

He's on the way . . . all set to show you the complete job, and he'll be glad to help you work out your own individual campaign.

Magic Chef

GAS RANGES

THE "RED WHEEL" GAS RANGE WITH THE LIFETIME BURNER GUARANTEE

AMERICAN STOVE COMPANY

BOSTON . . . . NEW YORK . . . . ATLANTA . . . . CLEVELAND . . . . CHICAGO
ST. LOUIS . . . . SAN FRANCISCO . . . . SEATTLE . . . . PHILADELPHIA . . . . LOS ANGELES
PITTSBURGH . . . . BALTIMORE . . . . WASHINGTON

World's Largest Manufacturer of Gas Ranges

• **William Reynolds,** of New York, advertising manager of Servel, Inc., received a special 15-year service medal from **Louis Ruthenburg,** president, at the company's mid-Winter sales conference held during the week of January 13 in Evansville, Ind.

In making the award Mr. Ruthenburg cited Mr. Reynolds for his excellent record and outstanding work during his 15 years of continuous association with Servel.

• The appointment of **C. F. Cushing** as sales promotion manager, **D. E. Leslie** as advertising manager, and **H. W. Heisterkamp** as manager of the Air Conditioning Sales Department has just been announced by The Bryant Heater Co., of Cleveland, Ohio.

Mr. Cushing joined the Bryant Engineering Department in 1935, and was made manager of the Air Conditioning Sales Department in 1938. Mr. Leslie has been a member of the Bryant staff since 1935, and has served in both the engineering and sales departments. Mr. Heisterkamp joined the Bryant Engineering Department in 1933 to assist in the development of heating equipment and dehumidifiers.

• The Brooklyn Union Gas Co., at their recently-held 16th Emblem Dinner, presented emblems to 187 employes denoting completion of 25 or more years in the company's employ.

Four of these were men who have reached or passed the half-century mark in service. Heading this group was **Robert J. Campbell,** who received a 60-year emblem. A 55-year emblem was presented to **Thomas F. Byrnes,** and 50-year emblems went to **John H. Heyen** and **Richard J. Welch**. All of these men are now retired.

• **Colonel Maurice W. Walsh,** formerly superintendent of gas distribution for the Louisville Gas and Electric Co., Louisville, Ky., recently announced his retirement from this post, after 27 years of service in that capacity. He plans a nine-state automobile tour, visiting utilities with which he was allied during his 52 years in the gas industry.

Col. Walsh was a charter member of the Natural Gas Association of America and attended every meeting until the Natural Gas Association joined the American Gas Association and has never missed a meeting of the consolidated organizations.

• **J. A. Schnable,** Ballinger district manager for the Community Natural Gas Co. of Dallas, Texas, probably will be assigned to the Army Air Corps training camp at San Angelo, Texas, as an instructor in the ground school as soon as that camp is opened. Mr. Schnable is a second lieutenant in the reserves and has already passed his medical examination preliminary to his assignment in the air corps.

• **R. R. Shideler,** Hastings, Neb., district manager for the Nebraska Natural Gas Co., Hastings, was moved recently to Salina, Kan., where he will be division manager of the Kansas Power and Light Co., Topeka, Kan. Mr. Shideler will be succeeded in Hastings by **H. J. Roberts,** division manager at Salina.

• Announcement was recently made that **William Porter Witherow,** Pittsburgh steel manufacturer and president of the Blaw-Knox Co., had accepted the 1941 chairmanship of the National Association of Manufacturers' Committee on National Defense and Industrial Mobilization.

CONTROLS *by* TITAN

IN THE MARCH ISSUE OF THIS MAGAZINE, AND ALSO IN BUTANE-PROPANE *NEWS*, WILL APPEAR AN ANNOUNCEMENT OF IMPORTANCE TO THE ENTIRE WATER HEATER INDUSTRY.

TITAN

9913 Elk Avenue
Cleveland, Ohio

407 Van Nuys Building
Los Angeles, Calif.

THE TITAN VALVE AND MANUFACTURING CO.
CLEVELAND, OHIO

o The election of a new director and the appointment of two other officers was announced recently by **William G. Woolfolk** president of the Michigan Consolidated Gas Co., Detroit, Mich.

ADAM KURTZ

HENRY TUTTLE

Adam Kurtz, vice president and secretary and treasurer of the company, was named to the board of directors, filling the vacancy caused by the death of the late James O. Murfin. A native of Wisconsin, Mr. Kurtz entered the Michigan Consolidated Co. in 1920.

CARTER SHIELDS

The new vice president is **Henry Tuttle**, who has been first assistant secretary and treasurer. Tuttle will be controller of the company. As assistant controller, **Carter Shields** has been named. Shields is a former chief accountant for the company, and during the past year has been assistant treasurer. Both Tuttle and Shields were educated in Detroit and came to the gas company in 1920.

• **Claude Vollmayer** and **Arthur Broderick** have recently joined the Roper sales organization and are now actively engaged in their respective territories.

Mr. Vollmayer will operate in New York state along with **A. F. Jenkins.** Mr. Broderick will work in New Jersey with **Frank France** and Roper Eastern Manager **W. J. Foster.**

o **R. C. Stoner** has been appointed vice president of Standard Oil Co. of California, filling the vacancy created by the retirement of **M. E. Lombardi.**

Stoner has been general manager of the producing department since 1931 and a member of the board of directors since 1938. He joined the Standard Oil Co. in 1913 and his first work was in the geological division of the producing department.

• Following the opening of a Washington, D. C., branch of the Porcelain Enamel Institute, Chicago, **P. B. McBride,** president, has announced the appointment of **Thomas B. Collins** as Washington representative. Mr. Collins was formerly western sales manager for the Alliance Porcelain Products Co. and was previously connected with the Kohler Co. and with Pierce, Butler & Pierce.

E. W. Krampert, widely known consulting geologist of Casper, Wyo., has been named as State Geologist for Wyoming by Governor **Nels H. Smith,** and will succeed to the position formerly held by **Dr. S. H. Knight,** of Laramie, who resigned.

• **Edward G. Boyer** has been appointed manager of the gas department of the Philadelphia Electric Co., succeeding **Leon B. Eichengreen,** recently deceased. Mr. Boyer, a graduate engineer of Lehigh University, entered the employ of the Philadelphia Suburban-Counties Gas & Electric Co., a predecessor of Philadelphia Electric, in 1927.

EDWARD G. BOYER

Mr. Boyer is a member of the American Gas Association, a past president and member of Council of the Pennsylvania Gas Association, and a member of important committees of both organizations.

• For his part in the rescue of an unconscious boy from within a gas-filled tank car last March, **Luke C. Rizzo,** an employe of United Gas Corp., Houston, Texas, Division, was awarded the President's Medal of the National Safety Council at a safety meeting of the company in its Navigation Boulevard plant recently. The presentation was made by **J. V. Strange,** vice president of the company.

• **Virginia Howery,** formerly of Fairview, Okla., recently assumed her duties as cashier in the office of the Consolidated Utilities Corp. in Weatherford, Okla. Mrs. Howery held a similar position with the company at Fairview, and has been in the employ of the company for seven years.

Miss Helen Wayne Guess, who was formerly cashier at Weatherford, has been assigned other duties in the division office, also located in that city.

• **R. S. Huffman,** safety director of the Olahoma Natural Gas Co., Tulsa, Okla., has been appointed state representative for the Oklahoma division of the national committee for the conservation of manpower in defense industries He was named to the high post recently by **C. A. Miller**, regional director, Houston.

• **Edwin L. White,** secretary-treasurer of The Laclede Gas Light Co., has been elected a vice president by the board of directors, it was announced on January 3 by **L. Wade Childress,** president.

E. L. WHITE

White joined the Laclède organization in June, 1921, after nine years with the Missouri Public Service Commission. He served as general accountant until 1925. when he was elected comptroller and a director. He was named secretary-treasurer of the company in 1932.

• **Mrs. Gordon Surguine,** sales representative for the United Electric Service, Inc., Monroe, La., was presented with a check and a gold master salesman's button recently by **Millard H. Cook,** district sales manager for Servel, Inc. The honors were extended Mrs. Surguine for her outstanding sales efforts this past year. Company officials stated that Mrs. Surguine had sold more than 100 Servel refrigerators in the Monroe territory during 1940.

The "inside story" of *PAYNE* House Heating Equipment is a story of many innovations in design...*Twice-Tested* in rigid "Proving Grounds." ☆ These *PAYNE* "exclusives" assure permanent owner-satisfaction ...and every satisfied gas furnace owner increases your load! ☆ That's why Gas Companies throughout the Nation recommend...merchandise... and sell vented *PAYNE* Furances.

PAYNE manufactures Modern Consoles, Floor Furnaces, Duplex Furnaces, Forced Air Units, Zoneair Units, and Gravity Furnaces. ☆ A few territories still open: write us.

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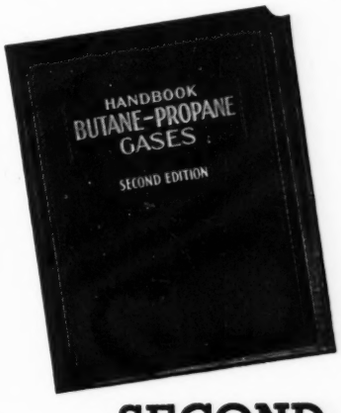
THE IDEAL FUEL GAS

HANDBOOK BUTANE-PROPANE GASES

415 Pages



CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricty, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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GAS
The Natural Gas Magazine

BUTANE-PROPANE News
1709 W. 8th Street
Los Angeles, Calif.

• Following Consolidated Edison organization changes announced last month, which included the creation of three new vice presidents and six new assistant vice presidents, several promotions and group realignments have been made. These are chiefly in departments reporting to Vice Presidents **L. B. Bonnett,** in charge of design, inventory, purchasing and stores; **A. H. Kehoe,** construction and shops; **H. R. Searing,** electric and gas operation and electric production, and **John C. Parker,** research development and planning.

The personnel of the Design and Drafting Bureau of Gas Maintenance-Construction, has been transferred to the General Drafting Bureau of Mechanical Engineering with **Paul Herfort** becoming an assistant draftsman.

The Purchasing and Stores Department, now reporting to Mr. Bonnett, is headed by **L. K. Murphy,** former manager of the Construction Contracts Bureau, as purchasing agent.

With Mr. Kehoe now are two assistant vice presidents: **George L. Knight,** former engineer of construction and vice president of Brooklyn Edison (who retains his Brooklyn post), and **Earl L. Griffith,** former engineer of gas maintenance and construction.

Joining the Outside Plant Construction group, under **L. A. Scofield,** general distribution manager, is the Gas Distribution-Subway Department headed by **G. W. L. R. Travis** as manager and **H. L. Peden** as assistant manager. Both were formerly in the Mains, Services and Tunnel Bureau, Gas Distribution Department.

The former Contract Control and Inspection Department, now the Contract Inspection Department, headed by **C. R. Beardsley,** manager, has **Ferdinand Zogbaum,** formerly co-ordinating engineer, as assistant to manager. **Fred Glaeser,** formerly of Gas Maintenance Construction, is now co-ordinating engineer.

In Station Construction and Shops, **J. L. Lufkin,** manager, **D. S. Hudson,** formerly associate engineer, Gas Maintenance Construction, is associate manager. Two new bureaus in this group are Mechanical Construction-Gas, headed by **G. E. Fink** and **H. W. Overton,** and Holder Maintenance and Painting headed by **J. W. A. McNary** and **L. B. Donovan.**

Mr. Searing now has **C. C. Simpson,** former engineer of gas distribution, as assistant vice president in the electric and gas operation and electric production field.

Customer Service (gas) has been merged with the Distribution Operation Department with **C. E. Hickey** as manager and **C. E. Muehlberg** as assistant manager. Mr. Muehlberg was formerly assistant engineer, Gas Distribution. The meter divisions, both gas and electric, have been combined as part of this department under **J. J. Ryan** as general superintendent. Mr. Ryan was formerly assistant general superintendent of the Distribution Construction Bureau.

C. C. Bahr, labor superintendent in the Gas Distribution Department, has been temporarily assigned to the staff of Messrs. Searing and Simpson.

The System Engineering Department, formerly in the design and planning group, has been transferred to Vice President **John C. Parker,** in charge of research development and planning, and its former head, **H. C. Forbes,** who was system engineer, has become assistant vice president. Mr. Forbes was succeeded by **R. F. Brower,** former assistant system engineer. The Budget and Forecasts Bureau is headed by **Atherton Thomas,** manager, and the System Planning Bureau is headed by **C. H. Sanderson,** system planning engineer.

The Research and Development Department is headed by **L. E. Frost,** former assistant to Mr. Parker, who is now research and development engineer. **George G. Hyde** is staff engineer. The Research Bureau has **W. F. Davidson,** director of research; the Technical Bureau has **J. H. Pilkington,** manager; the Economic Research Bureau has **G. J. Read,** manager.

Edward Falck is special assistant to Mr. Parker and Mr. Forbes.

• **R. S. Agee,** sales promotion manager of Gas Appliance and Equipment Manufacturers, New York City, leaves that organization

R. S. AGEE

J. E. BOGAN

on Feb. 1, according to a recent announcement. He will become vice president of the Roberts & Mander Stove Co., Hatboro, Pa. Mr. Agee has been in charge of the CP gas range promotional activities for the Association for approximately three years, coordinating the merchandising and promotional programs of department stores, dealers and utility companies. He has represented the industry in both Canada and the United States.

Mr. Agee's duties with the Association will be assumed by **John E. Bogan,** field counsellor for the CP gas range program of the A.G.A.E.M., and formerly director of sales for the Central Illinois Light Co., Peoria, Ill.

• **John H. McKenna,** utility sales manager of the Knapp-Monarch Co., was elected president of the Electrical and Gas Association of New York at its annual meeting recently.

Mr. McKenna has held many officerships in associations of the electrical and gas industries and is prominently known in many fraternal organizations.

Charles D. Frazer has recently assumed his new duties with the Brooklyn Union Gas Co., Brooklyn, N. Y., as manager in charge of publicity and advertising. One time member of the Batten Barton Durstine and Osborn organization. Mr. Frazer was more recently with John Kelly and Associates, New York publicity organization.

• **Charles F. Schlichter,** Washington, D. C., has recently been appointed sales manager of the Utility, Builders' and Plumbing Supply Department of the Edgar Morris Sales Co., Washington, distributors of gas and electrical appliances in Washington and parts of Maryland and Virginia.

• **Chester C. Moore** of Frederick, Texas, district manager for Community Natural Gas Co., has been named chairman for 1941 safety meetings of Community Natural and Lone Star Gas Co. employes in the Frederick and Vernon and Electra, Texas, districts, according to **A. W. Breeland** of Dallas, safety supervisor. Moore succeeds **L. R. Blackstock,** Lone Star storekeeper at Vernon.

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Hydraulic
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PUSHER

Send for New Pusher Bulletin

The No. 790 Pusher, shown here, has capacity for pipe from 1¼ to 4-inch, with pushing pressures ranging from 6500 to 40,000 pounds. The No. 795 Pusher will handle large drainage ducts, sewer pipe, and pipe beyond 4 inches. This pusher has pressures ranging up to 75 tons.

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New uses for Propane and Butane are constantly being developed for Utility operations,—uses which solve problems for gas plant operators and create greater profits. Propane and Butane may be the answer to your problems and may save you thousands of dollars. Request information now!

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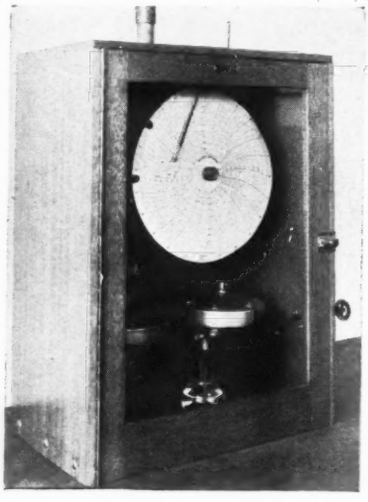

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The accuracy in manufacturing and painstaking attention to detail that have made American Recording Charts the leaders for years are now applied to building the complete line of Anubis Instruments. For example, this direct-weighing Gas Gravitometer produces a highly accurate temperature compensated record of specific gravity that reads direct to the second decimal place, and by easy approximation can be read to the third decimal place. Employs no electric motors or other mechanical complexities.

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LOS ANGELES, CALIF.

Detroit-Michigan Sales Meeting

CLOSE to 50 sales managers and district managers from all territories gathered in Detroit recently for the annual sales convention of the Detroit-Michigan Stove Co., Detroit, and unveiling of the new Detroit Jewel and Garland domestic gas range lines for 1941.

The entire week was taken up with the presentation of the three new series under each brand name, cooking and baking demonstrations of the new models, and completing the company's plans for increasing retail distribution this year.

Actively participating in the proceedings of the five-day meeting were William T. Barbour, chairman of the board of the company; John A. Fry, president; John C. Pankow, sales director; F. A. Kaiser, general sales manager; Paul Inskeep, central division sales manager; C. M. Jewell, eastern division sales manager; Jack M. Little, southwestern division sales manager; K. S. Gray, northwestern division sales manager; E. J. Shermire, commercial sales manager, and L. E. Clancy, advertising manager.

Unique features of the week included retail sales demonstrations put on by district managers, for the benefit of all district managers in contact with retailers and their salesmen. Another was actual baking and broiling in the new models. District managers prepared the meats and mixed the batters —and the finished results were consumed with gusto. One entire day was given over to the range lines specially built for hotel, restaurant and institution equipment under Mr. Shermire's direction.

After a year of very satisfactory progress, the company looks forward to another substantial increase in 1941 with the new Senior, Master and Pacemaker "41" Series in standard and CP models.

■ ■

Manufacturing Space Tripled By Selas Company

The Selas Co., Philadelphia, producer of gas combustion equipment and furnaces for process industries, recently opened their new plant with an informal reception for 44 gas utility and manufacturing company friends.

All development, engineering and manufacturing facilities are now centralized in three modern structures on Erie Avenue west of D Street, Philadelphia. The culmination of 10 years of planning, the new quarters provide up-to-the-minute conveniences for every employe and job, as well as leeway for possible future expansion.

■ ■

Southern California Gas Co. To Build New Office

Ground was broken in Visalia, Calif., on Thursday, January 24, for the construction of a new Southern California Gas Co. business office and division headquarters building. Cost of the project, including land and building, will amount to around $100,000.

The structure will be reinforced concrete, one story in height, and will cover an area 90 by 100 feet. An air conditioning plant, designed by gas company engineers, will supply complete summer and winter temperature and humidity conditioning, with heat and power supplied by gas.

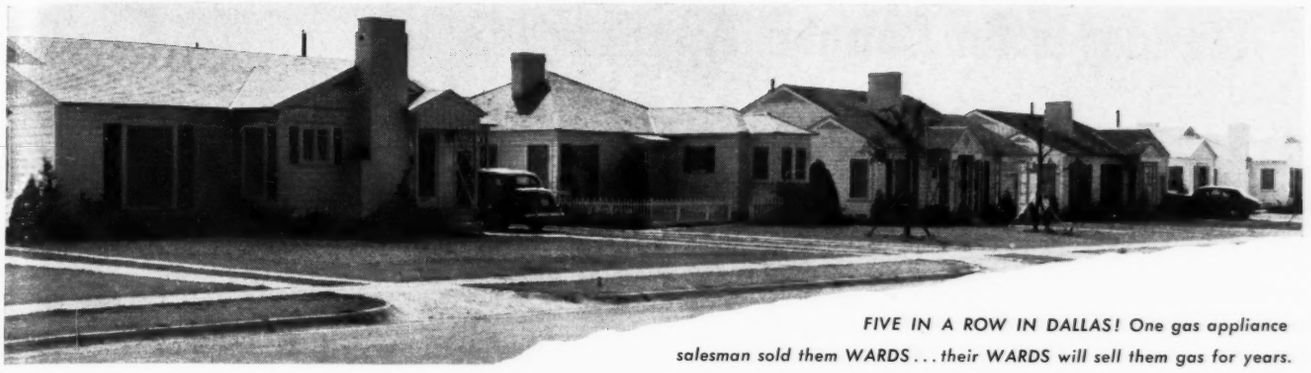
It is expected the new quarters will be ready for occupancy on the first of May.

■ ■

Two Big Oklahoma Wells

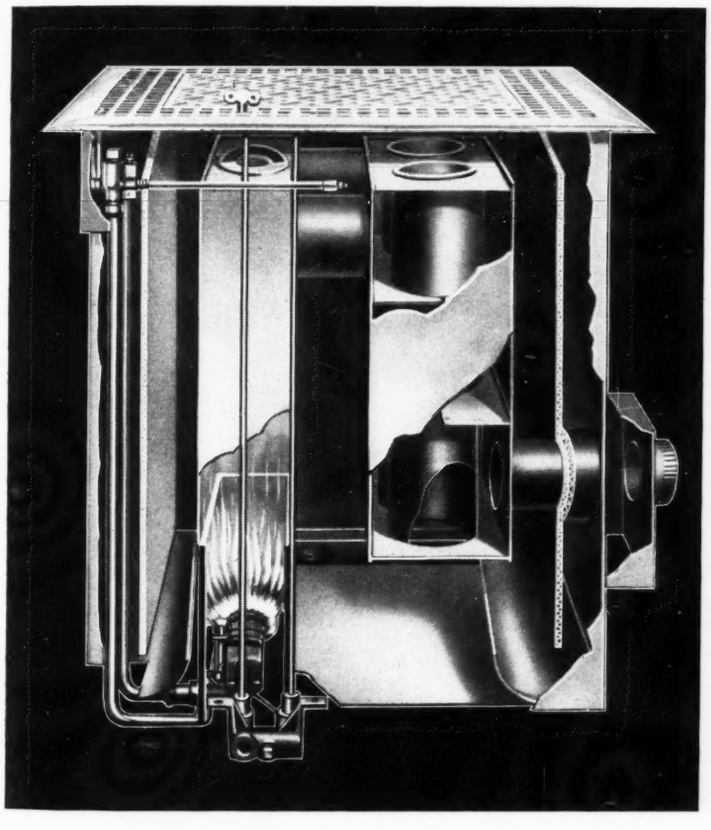
Among big gas wells recently discovered in Oklahoma are two, reported November 30, completed in the Charlson sand, on the flank of the Chickasha field of Grady county.

One of these wells cleaned out into the air at 198,000,000 cu. ft. a day and the other gaged 38,500,000 cu. ft. a day.



FIVE IN A ROW IN DALLAS! One gas appliance salesman sold them WARDS . . . their WARDS will sell them gas for years.

In how many homes like these are you losing *permanent* space heating revenue?



MEDIUM INCOME HOMES
HOMES WITH NO BASEMENT
HOMES WHERE FIRST COST IS IMPORTANT

★

Make them YOURS with an Automatic, All-Gas WARD FLOOR FURNACE

The WARD is a *gas* floor furnace that does its job on *gas* alone. Its Bilt-in Thermo-Control . . . a thermostat that is really accurate . . . works on *gas* pressure. This and *all* other automatic features are inside furnace, *entirely self-contained.* No wires. No electrician. No juice.

A WARD FLOOR FURNACE is *permanent.* It stays put. It wins lasting friends for gas. You can depend on a WARD to perform for years and years in a way that proves gas is the *dependable, clean, economical* fuel.

WARD FLOOR FURNACES will increase your space heating revenue in 1941 . . . as they have been doing for gas companies for more than a quarter century.

AND HERE ARE THE FACTS

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SEE YOU IN THE TEXAS SUITE, HOTEL ADOLPHUS, DALLAS, TEXAS . . . SOUTHERN GAS ASSOCIATION MEETING . . . FEBRUARY 10 - 12

Standards for Counter Appliances

THE last few years have witnessed remarkable progress in the development of many types of gas-fired counter appliances. This, together with the very satisfactory service of American Gas Association Laboratories tested and approved hotel and restaurant ranges, has resulted in demand for similar certification for other commercial gas-burning equipment. To meet this need, the A.G.A. Subcommittee on Approval Requirements for Gas Counter Appliances, under the chairmanship of Mr. T. J. Gallagher, Manager Commercial Sales Department, The Peoples Gas Light and Coke Co., Chicago, Ill., undertook a comprehensive investigation of commonly used types of such equipment. These included gas coffee brewers, coffee urns, food and dish warmers, waffle bakers, hot water immersion sterilizers, hot plates, and griddles.

Based on the data secured, which includes extended studies of performance of many styles of contemporary models, Mr. Gallagher's committee recently completed the most extensive set of approval standards yet prepared covering such equipment. General provisions applying to construction are of particular interest to manufacturers, as well as consumers. All are in keeping with latest concepts of safety and convenience.

It is believed these new specifications provide adequate national standards for gas counter equipment. However, in line with customary procedure they have been placed in the hands of the industry for criticism and suggestions. To insure that all comments may be given full consideration, it is requested that they be submitted to Mr. R. B. Harper, Chairman, A.S.A. Sectional Committee, Project Z21, A.G.A. Approval Requirements Committee, in care of the American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland, Ohio, on or before January 31, 1941. It is anticipated that these new standards will become effective as American Standard on January 1, 1942.

■ ■

Pipe Line Purchase O. K.'d By Pennsylvania Commission

The Pennsylvania Public Utility Commission at Harrisburg recently gave its approval to a $165,686 deal for the purchase of pipe lines and gas lands in northern Pennsylvania and New York.

It approved two agreements between North Penn Gas Co. and New Penn Development Corp. under which North Penn would buy from New Penn approximately 24,900 ft. of pipe line and two compressor stations in Potter and Tioga counties for $63,323; and Allegany Gas Co. would buy from New Penn 50,100 ft. of pipe line, gas lands, lease holds, and other facilities in Tioga, Potter and McKean counties, Pennsylvania, and in Allegany, Steuben, and Chemung counties in New York, for $102,363.

■ ■

Standard Gas and Electric Sets Construction Budget

Public utility operating companies in the Standard Gas and Electric Co. system have a preliminary and tentative construction budget for 1941 amounting to $53,807,229, according to an announcement made recently.

There is also the possibility of further additions to the 1941 budget being authorized during the year as conditions may demand, it was stated. Such projects would increase the budget by from $5,000,000 to $7,000.000 or to a total budget of approximately $60,000,000.

A classified summary of the total preliminary and tentative budget indicates estimated expenditures in the gas departments of the operating companies in the system totaling $4,367,156.

■ ■

Newark, Ohio, in Midst Of Natural Gas Boom

New-found gas in Newark, Ohio, has changed the erstwhile homey-looking west side residential area into a derrick-ridden land of well equipment, for it was in this immediate area that the gas was found. Beginning last August, when a Pittsburgh drilling company came through with a producer just outside the Newark city limits, the boom now embraces 25 wells, all producing between 500,000 and 2,000,000 cu. ft. a day, and almost all located in back yards on the west side. The gas is largely piped to nearby Homer, Ohio, where it is refined and redistributed for use in both Newark and the entire state.

■ ■

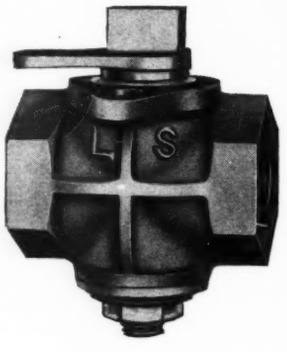
New Michigan Pipe Line Now Under Construction

The construction of a pipe line from Ithaca, Mich., to the North Star gas field in Michigan is now under way. The line will carry the gas from the Cook No. 1 well in that field as well as that from other wells to be drilled in that area. Consumers Power Co., Jackson, Mich., will tap in the pipe line at Ithaca, using the new source as an added supply to supplement that now coming from Crystal, Six Lakes, Belvidere and other pools.

The Lattimer-Stevens Company

"MIRROR FINISH"
STOPCOCKS
STANDARD AND LUBRICATED
PRECISION MACHINED

Columbus, Ohio



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You never hear Klixon Electric Gas Valves in operation. They're absolutely silent. No humming. No chattering. No sticking. For they contain no solenoids. They're **Thermally** operated — by a snap-acting thermostatic disc.
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Available separately or in sets complete with Klixon Snap-acting Room Thermostats.

Write for more information.

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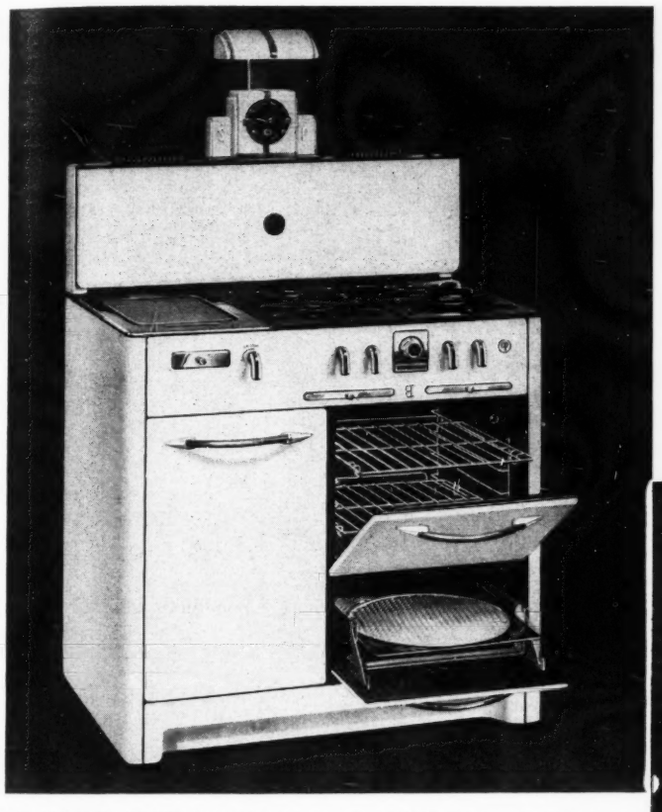
WEDGEWOOD *Gas Ranges*

SET THE STANDARDS FOR COOKING PERFORMANCE



CP MODEL 5185 (above) with top griddle and warmer, is ideal for every frying purpose and useful in keeping foods hot. Chrome finished **Reflector Plate** — an exclusive Wedgewood feature — provides added convenience for adjusting griddle burner flame. May be obtained with gas circulating heater.

CP MODEL 6285 (right) with divided top and top griddle plus built-in gas circulating heater introduces a new conception of comfort and efficiency. Provides cheerful warmth on chilly mornings, quickly and economically. Available without gas circulating heater.

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WEDGEWOOD RANGES ARE FACTORY BUILT FOR ALL TYPES OF GAS

Wedgewood's Outstanding Performance establishes new high standards of cooking perfection and service. Styled in tune with the modern tempo, WEDGEWOOD combines enduring beauty with lasting utility.

Cooks Your Food
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Heats Your Rooms
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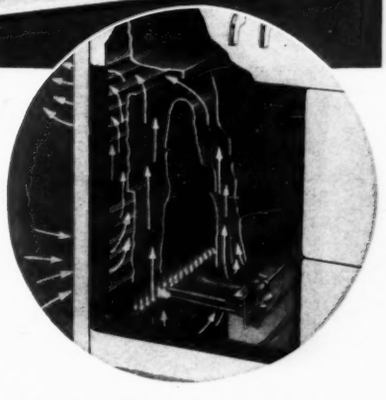
LIGHTS ITSELF INSTANTLY AT THE TURN OF A VALVE



WEDGEWOOD

THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO. • Los Angeles - San Francisco - Newark, California - Portland, Oregon

Northern Natural Enters $50,000,000 Mortgage

A MORTGAGE for $50,000,000, covering the huge properties of the Northern Natural Gas Co., Omaha, Neb., was recently filed in every county through which the lines of the company pass. The mortgage and trust deed covers both real and personal property of the gas company, including oil and gas wells in southern states, pipe lines in various states, pipe line easements in other states, town border sites along the company's holdings, meter station sites, river pipe line crossings, oil and gas lines and other properties. Hundreds of land descriptions are set forth in the mortgage and trust deed as to the oil and gas properties covering thousands of acres in Kansas and Texas.

Comprising 353 printed pages, the cost of preparing the mortgage and trust deeds is said to have been enormous, as the properties of the company are located in seven states.

■ ■

Indianapolis Gas Holder Nearing Completion

Now nearing completion, the new 12,000,000-cu. ft. gas holder of the Citizens Gas and Coke Utility was one of the major utility construction projects of the year 1940 in Indianapolis.

Construction of the new waterless, piston type holder began at the Langsdale avenue property of the utility last July. Utility officials now expect the immense holder to be completed the first part of this month. Although new in Indianapolis, this type of holder has been in use in some cities more than 20 years. It is 218 ft. in diameter and 361 ft. high. Equipped with inside and outside elevators for inspection purposes, the new holder will have cost $700,000 when completed.

■ ■

Michigan Gas Production Reaches All-Time High

Greater use of casinghead gas for gasoline production, as well as increased drilling activity and more sales of dry gas, are believed to account for the new all-time high in Michigan natural gas production reached in the first 10 months of 1940.

Production of 11,025,768,000 cu. ft. in the first 10 months of last year, reported by F. R. Frye of the state conservation department's geology division, exceeds the previous high of 10,137,003,000 cu. ft. in 1939. For all of 1940 it may approach 14 billion cubic feet, according to Mr. Frye.

■ ■

New Gas Discovery Made In Central Oklahoma

A gas field was discovered in Okfuskee county, Okla., when the Deep Rock Oil and Fred Coogan No. 1, Earl Davis, southwest of Okemah, gaged 52,285,000 cu. ft., of gas per day after acidizing through perforations at approximately 3900 ft. in the Hunton lime.

Prior to acid treatment the well gaged 6,000,000 cu. ft., per day.

SEMET-SOLVAY
ENGINEERING CORPORATION

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Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

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MUELLER GAS DISTRIBUTION EQUIPMENT

The time-tested Mueller line includes Mueller Evenflow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

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Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
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Central Power Announces Gas Property Sale

THE sale of all properties of the Central Power Co., Grand Island, Neb., was completed recently with announcement by V. M. Johnson, president of the company, that gas properties in Grand Island, Kearny and Hastings, and gas and water properties in Nebraska City, all of Nebraska, had been sold.

The Grand Island and Kearney gas properties go to the Northwestern Public Service Corp. of Huron, S. D., and will be operated by the company together with the gas properties in North Platte. Headquarters will be in Grand Island, and Mr. Johnson will continue temporarily as general manager. The sale price was $535,000.

The Hastings and Nebraska City properties were sold to Fred A. Grosser of Chicago, representing John Nubeen and Co., investment brokers. He will operate them until their final disposition, perhaps to the two municipalities. Mr. Johnson will also manage these properties until they are sold by Grosser.

The changes in ownership became effective January 6.

■ ■

Natural Gas Considered At New Albany, Ind.

The board of directors of the New Albany, Ind., Chamber of Commerce recently took a stand in the interest of the ultimate substitution of natural gas for the manufactured product in their city. The action was taken following adoption by the board of a resolution which seeks a conference between Mayor Noble F. Mitchell and Public Service Co. officials to consider the proposal.

Prior to the adoption of the resolution Mayor Mitchell had asked the directors to cooperate with him in an effort to obtain natural gas at a new schedule of rates.

■ ■

Oklahoma Natural Gas Co. Holds Branch Open House

A modern and completely equipped gas kitchen was the center of interest for the three-day open house of the Shawnee, Okla., branch of the Oklahoma Natural Gas Co., of Tulsa. The gas company there recently completed an extensive remodelling and redecorating program and now is holding open house to permit customers to see the additions and changes in the buildings.

■ ■

Wage and Hour Ruling

The obligation to pay time and one-half after 40 hours, under the Fair Labor Standards Act, is not voided by the existence of a union contract calling for a workweek of more than 40 hours without the payment of overtime—except in certain instances—according to a recent announcement by Colonel Philip B. Fleming, Administrator of the Wage and Hour Division, U. S. Department of Labor.

■ ■

Franchise for Minco, Okla.

The citizens of Minco, Okla., recently secured the required number of meters necessary for natural gas service to that community, and will soon have opportunity to vote on the subject. The franchise is expected to be granted. White Fuel and Gas Co. of Sayre, Okla., is to serve the gas.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

GAS APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

1941
AUTOMATIC GAS WATER HEATER CAMPAIGN

featuring

$10 TRADE-IN ALLOWANCE ON OLD WATER HEATERS

STARTS Feb. 1

Similar to last year's campaign but much broader in scope. All manufacturers may participate . . . trade-in applies to ANY old water heater . . . advertising — and lots of it — is directed into ALL territory where P. G. and E. serves gas. Essentially a dealer-planned campaign, with all the practical, down-to-earth measures which experience has shown produce results.

G 202-241

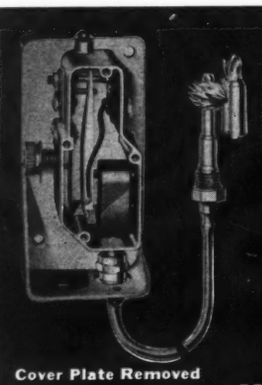
DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

CURRENT *Reading*

Technical

Text-Book of Physical Chemistry — Samuel Glasstone; 1289 pages; charts; published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York; $10.00. Intermediate text covering the whole field of physical chemistry. Beginning with a consideration of the structure of the atom, a discussion of spectra and the quantum theory, the first part of the text leads to a study of wave mechanics, and of the reasons atoms combine. Radioactivity, a study of isotopes, artificial disintegration of atoms, and induced radioactivity are followed by a chapter on the second approach to physical chemistry, through the applications of thermodynamics. These provide the basis for consideration of the physical properties, structure, and interconnection of the gaseous, liquid, and solid states of matter.

HOTEL CHELSEA
RIGHT ON THE BOARDWALK
FROM $6 WITH MEALS & BATH
$3 ROOM ONLY & BATH
Per Person 2 in a Room
FOR RECREATION OR RELAXATION
Choose the Chelsea
Here you will find everything to further your comfort and enjoyment — outside ocean-view rooms . . . wide verandas for lounging . . . sun deck . . . beautiful dining room at the ocean's edge . . . superb cuisine . . . varied sports and entertainment. You'll like your fellow guests, too, and the delightfully friendly atmosphere of the Chelsea.
SPECIAL WEEKLY RATES
ATLANTIC CITY
JOEL HILLMAN • J. CHRISTIAN MYERS • JULIAN A. HILLMAN



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Rapid Determination of Hydrogen Sulfide and Mercaptan Sulfur in Gases and in Aqueous Solutions — J. A. Shaw. *Industrial and Engineering Chemistry*, Anal. Ed., Nov. 15, 1940, pp. 668-671. A rapid method is described for the determination of hydrogen sulfide and mercaptans in gases and in aqueous solutions. The hydrogen sulfide and mercaptans are totally absorbed by a specially prepared cadmium chloride solution in a new type of flask. The determinations are made by iodometric titration under definite conditions designed to eliminate several sources of error without burdensome increase in time and manipulations. The required time for the laboratory manipulation is from 5 to 30 minutes.

Welding Technique in Vanguard of Pipe Line Building Progress—A. F. Davis. *Oil and Gas Journal*, Sept. 19, 1940, pp. 131, etc. Advances have been made in pipe-welding procedure and equipment which benefit both pipe line constructor and operator by enhancing the inherent quality, simplicity and economy of the arc-welding method of pipe line construction and maintenance.

Methods of Reducing Accidents at Pipe Line Pumping Stations — H. F. Simons and Paul Reed. *Oil and Gas Journal*, Sept. 26, 1940, pp. 53, etc. Measures adopted for increasing the safety of conditions at pipe line pumping stations, and practices for safeguarding operations in constructing and maintaining pipe lines are dealt with in this article.

Relocating Transmission Line in Flood-Control Area — S. S. Donaldson. *Oil and Gas Journal*, Sept. 19, 1940, pp. 87-88. This is one of the main transmission lines from Newhall to West Los Angeles, Calif., station and in order to guarantee uninterrupted delivery, it was necessary to relocate the line. Describes how this was accomplished.

Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating, Air Cooling and Ventilating Systems — N.F.B.U. Pamphlet No. 90, October, 1940.

Heating Natural Gas to Prevent Hydrate Formation — J. R. Cowles. *Petroleum Engineer*, Nov., 1940, pp. 27-30. This article concerns the heating of gas at the wellhead when a pressure reduction is made that would otherwise cause freezing. The data presented are not limited, however, to this specific use. The necessary physical data for design and analytic purposes are presented first, and are followed by actual heater data. Pressure drop calculations, for which Weymouth's formula does not hold, are also discussed.

The First Ten Years of Electrical Protection of Pipe Lines — F. A. Hough. *California Oil World*, Nov. 1, 1940, pp. 10, etc. This paper is devoted to a brief discussion of the following questions taken in the order listed: (1) Briefly, and in simple term, what is the theory of the process? (2) How is the process applied in the field? (3) How do we know it works? (4) How much does it cost? (5) Is the cost justified?

Combustion of Methane: Displacements of Mixtures Giving Maximum Flame Velocities — A. R. T. Denues and W. J. Huff. *Journal American Chemistry Society*, Nov., 1940, pp. 3045-3047. Data showing effects of the oxygen content of atmospheres used for the combustion of methane on flame velocities and on displacements of

mixtures giving maximum flame velocities are presented and discussed briefly. A new regularity between these displacements in the combustion of methane and parameter cited has been adduced that contrasts with earlier indications for methane and complements relations derived by the writers from published data for other gases.

A.S.T.M. Standards on Petroleum Products and Lubricants—Sept., 1940. Prepared by Committee D-2 on Petroleum Products and Lubricants.

Natural Gas — F. S. Lott and G. R. Hopkins. Reprint from *Minerals Yearbook*, 1940.

General

Industry Seeks Definition of Part in National Defense Program — G. A. Hill, Jr. *Oil and Gas Journal*, Oct. 10, 1940, pp. 25, etc. Author tells what he believes the industry should strive for in correlating its efforts with those of the National Defense Advisory Commission. In a 13-point program he urges: (1) business as usual; (2) prepare for increased aviation-fuel production; (3) enlarge transportation facilities; (4) release marine facilities; (5) investigate underground storage; (6) aid in toluene manufacture; (7) speed up synthetic rubber production; (8) allocate contracts intelligently; (9) aid employees in military service; (10) locate new oil reserves; (11) employ research facilities to fullest extent; (12) steer clear of a course that will lead toward government control, and (13) continue its efficient operation under present organization, without divestiture of the essential elements to its integrated production. Abstract of an A.P.I. paper, East Texas Chapter, October 9.

Oil War Over Here—Ruth Sheldon. *Saturday Evening Post*, Jan. 4, 1941. The story of the Department of the Interior vs. the oil industry. Does the administration want to conserve our petroleum resources or to be "oil dictators"?

Machine Tool Expansion for National Defense — Published by the National Machine Tool Builders' Association, Cleveland, Ohio. A survey based upon information as to plant expansion, employment, and engineering and development work undertaken on behalf of the national defense program, obtained from 115 companies representing approximately 80% of the total machine tool capacity of the country.

Home Service News — Published by the American Gas Association, New York, N. Y. Contains recent "news round-up," plans for 1941, home service demonstration contest information. news of regional meetings and a "cook-book revue."

Employers' Digest — Published by the Wage and Hour Division, U. S. Department of Labor, Washington, D. C. This pamphlet contains the latest information concerning the wage and hour law, especially information pertaining to the change in the standard workweek which dropped from 42 to 40 hours on Oct. 24.

Smoke Screen — Samuel B. Pettengill. Distributed by America's Future, Inc., 205 E. 42nd St., New York City. Price, $1 per copy, postpaid. 126 pages. This book was written by a former member of Congress to demonstrate that we are moving toward National Socialism.

11.4% CO_2 with JOHN ZINK BURNERS

Series Y Register Type Combination Burners

John Zink Series Y Register Type Combination Oil and Gas Burners for heating and power boilers meet the rigid government specifications for this type heating equipment.

Flue gas analyses—in recent Naval Air Base Boilers—show that CO_2 readings approaching the theoretical maximum were obtained when boilers were fired by the Series Y Burners. John Zink Series Y Burners are furnished in sizes from 14" to 30".

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YOUR NEW CATALOG
OF VALVES AND ACCESSORIES FOR GAS APPLIANCES
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THE W. J. SCHOENBERGER CO
CLEVELAND, OHIO

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If you have not already received a copy of this catalog, let us know and we'll be glad to send you one. It contains hundreds of illustrations, together with technical information, interesting to both manufacturer and engineer.

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ADVANCED ENGINEERING
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PRE-TESTED EFFICIENCY
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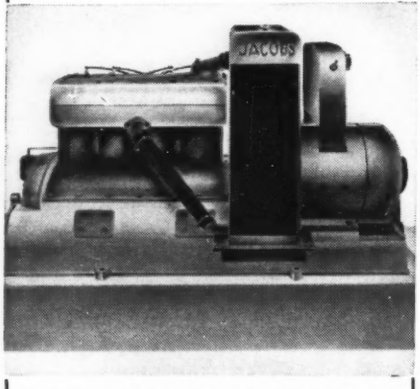
Special Pipe Line Cathodic Protection Unit



NEW JACOBS SUPER MODEL
FOUR CYLINDER UNIT

Operates on Natural Gas, Butane or Gasoline

This new super power unit is designed to meet cathodic requirements of 1000 to 5000 watts. Maximum output, 150 amperes, 10 to 40 volts.

Slow speed, few moving parts and sturdy construction of this unit make it America's leading pipe line cathodic protection plant. Guaranteed.

Write at Once for Details, Prices

The JACOBS WIND ELECTRIC CO. Inc.
PIPE LINE DIVISION
MINNEAPOLIS, MINNESOTA

New Form, Cover Feature Laboratories' Directory

REVISIONS and additions have been incorporated in the January, 1941, issue of the Directory of Approved Gas Appliances and Listed Accessories released by the American Gas Association Testing Laboratories, Cleveland, Ohio.

This directory is published quarterly in complete form as of January 1, April 1, July 1, and October 1, each issue superseding all previous lists. Supplements to the quarterly directories are published as of the first of the eight intermediate months.

To facilitate locating listing of various manufacturers' products, a manufacturers' index was added this year. Likewise, in order to identify a manufacturer of a product from its trade-mark, or trade-name, a trade-name index was also added.

A new cover design has been adopted and colored covers are used for the quarterly directories. Illustrated on the outside cover are the two modern buildings which house the testing facilities of the Laboratories.

The January 1, 1941, issue of the directory contains over 17,000 individual appliances and accessories. If variations due to color combinations, trim, and other details are taken into consideration, more than 300,000 models are listed. These include some 37 types of domestic and commercial gas-burning equipment and their accessories, for use with natural, manufactured, mixed, and liquefied petroleum gases, for which American Standards have been prepared.

■ ■

Connelly Iron Sponge To Enlarge Plant

Connelly Iron Sponge & Governor Co., Chicago, Illinois, and Elizabeth, New Jersey, announces extensive additions in its production facilities for the manufacture of governors, regulators, back pressure valves and other devices used in the production, distribution, control and consumption of manufactured and natural gas. Installation of new equipment and acquiring of augmented plant facilities is reportedly due to the increase of business which has resulted largely from changes in design and construction of the Connelly line of products made by the engineering department. In addition, contracts have been let for building a new laboratory and enlarged office space necessitated by increased demands on the gas purification division, according to A. L. Smyly, president of the company.

■ ■

Strong City Gas Co. To Buy Twin Cities

Hillman Amerine, manager of the Strong City Gas Co. of Strong City, Kan., announced that his company had secured an option to purchase the Twin Cities Gas Co. of Cottonwood Falls, Kan., owned by E. D. Wilson.

The Twin Cities Co. is nearly 30 years old, and until the Strong City Co. was organized also served that town with natural gas.

■ ■

Ohio Fuel Gas Completing $400,000 Ohio Program

An expansion program costing $400,000, and made necessary by the national preparedness program and increasing domestic consumption, is being completed at Springfield, Ohio, by the Ohio Fuel Gas Co., Columbus, Ohio, according to recent announcements.

The program, now completed, gives Springfield two instead of one main feeder pipe lines, almost doubling the amount of natural gas made available to Springfield consumers.

A new compressor station was constructed near Mt. Sterling at a cost of $350.000. Also finished is a regulator station northwest of Springfield to control the flow of gas to other cities, and a new regulator feeding station at the company's West End plant.

■ ■

Oklahoma Natural Gas Co. Holds Fall Meeting

The Oklahoma Natural Gas Co., of Tulsa, Okla., recently held their annual fall meeting of executives and department heads in Claremore, Okla. Joe Breeden, Claremore office manager, was host to the representatives. President of the company Joseph Bowes and treasurer O. L. Jones made the principal addresses. They discussed "The Business Outlook for 1941" and "How Oklahoma Natural Can Better Service Their Customers."

Between 40 and 50 representatives from northeast Oklahoma and points in Kansas were present. This was the first time in the history of the company that the annual meeting was held outside of Oklahoma City or Tulsa.

■ ■

Union Gas Co. Utilizes Subterranean Reservoir

The Union Gas Co. of Independence, Kan., is now establishing a subterranean reservoir northwest of Sedan, Kan., in Chautauqua county for natural gas from an Elk county field.

In what is virtually a "refill," gas drawn from wells in the vicinity of Moline and Longton, Kan., is being forced into the unoccupied gas sand, from which gas was drawn for a period of 30 years, which lies at about the 600-ft. level. The first step in the storage program was the obtaining by the company of rights to land believed to cover the entire exhausted field, so that any other wells would not tap the stored gas.

■ ■

Montana-Dakota Bond Issue Sold in One Day

Offered Wednesday, January 8, the two-part $10,000,000 issue of the Montana-Dakota Utilities Co., Minneapolis, had all been sold by the close of business on the same day. Because of the extensive natural gas and electric power operations of the company in Montana and the Dakotas, large blocks were in demand and were all in investors' hands early in the day.

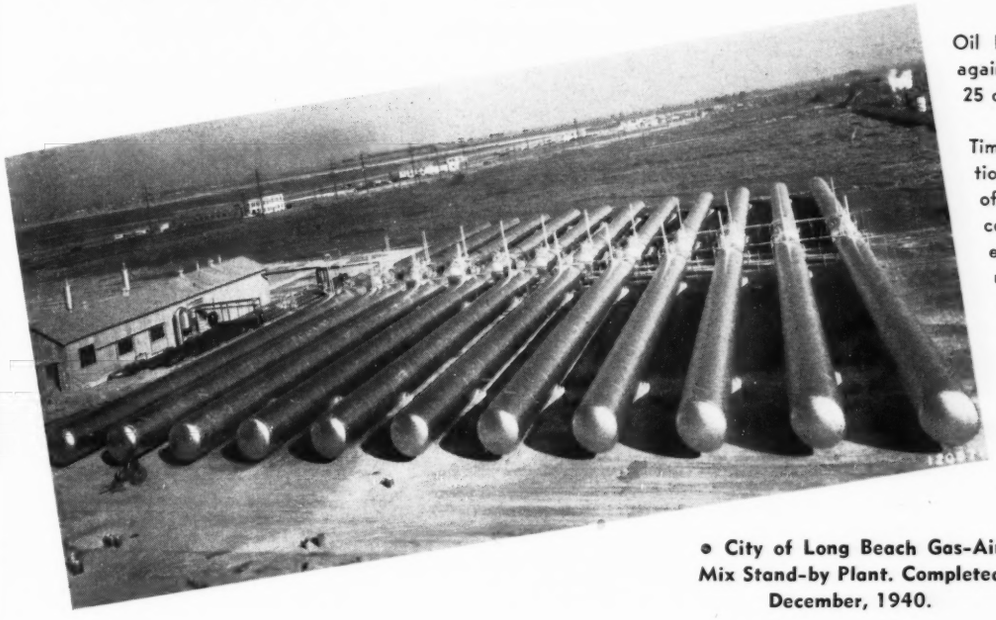
The issue consisted of $7,500,000 first mortgage 3½s and $2,500,000 first mortgage 2½s. Refunding operations for which the new issues are to be employed will save the company about $140,000 a year in interest.

■ ■

Southern Counties Gas Co. Holds Annual Sales Dinner

The 30th Annual Sales Dinner of the Southern Counties Gas Co., Los Angeles, Calif., was held in that city January 23. Attended by approximately 130 men, the dinner featured addresses by Clyde H. Potter, F. S. Wade, A. F. Bridge, and Norman R. McKee. The dinner commemorated the company's third million dollar year in the sale of gas appliances to the consumers in their territory.

"OK" says City of Long Beach



Oil Field Construction Company again completes a turnkey plant 25 days ahead of schedule.

Time saving ideas for construction and complete coordination of work made it possible to complete, test and put into operation the world's largest liquefied petroleum gas-air mix plant ahead of schedule.

Other jobs now under way: San Diego Destroyer Base Power Plant and March Field Boiler Plant.

• City of Long Beach Gas-Air Mix Stand-by Plant. Completed December, 1940.

OIL FIELD CONSTRUCTION COMPANY

ENGINEERING CONTRACTORS

2650 Cherry Avenue
LONG BEACH, CALIF.

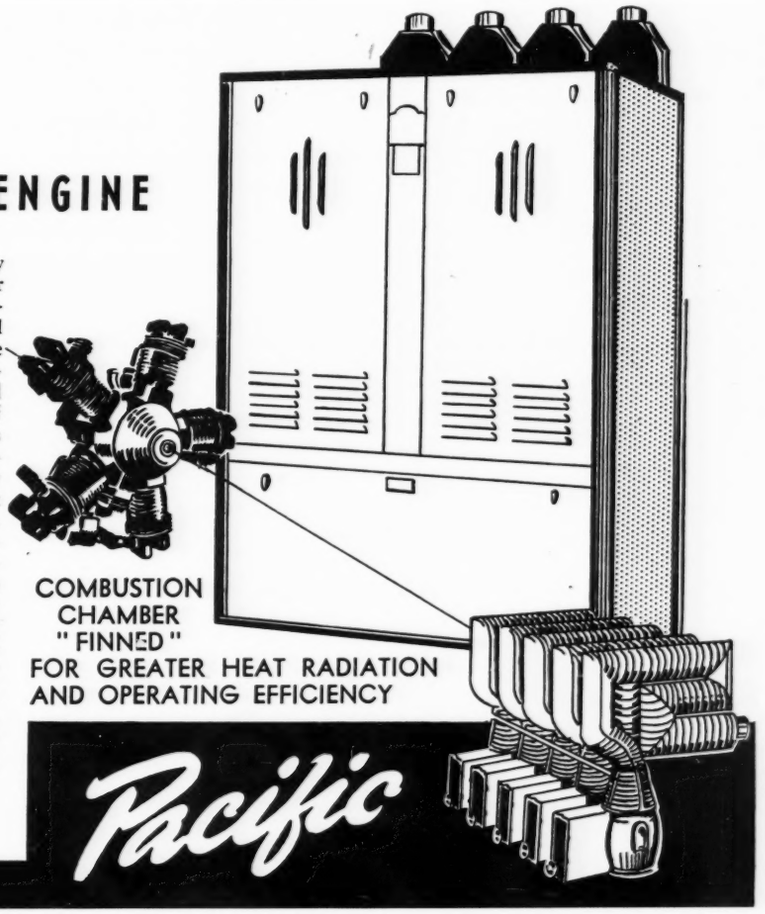
BOILER PLANTS
REFINERIES

COMPRESSOR PLANTS
ABSORPTION PLANTS

LIKE AN AIRPLANE ENGINE

BUILT to exacting requirements for heavy duty service, the "Pacific" Everlast Blower Furnace combines rugged endurance with extremely high operating efficiency. ★ Of special interest is the heating element. It is durable cast-iron, streamlined and finned like an airplane engine for unrestricted airflow and rapid transfer of maximum heat. The element is of sectional construction, each section having its own venturi type burner. All joints are machine-surfaced and bolted together with heavy asbestos gaskets to form an integral gas-tight leakproof unit of great strength and durability. An inter-connecting passageway provides burner-to-burner flame travel from the pilot ★ Heating element assemblies are enclosed by double wall casings between which fan-forced air constantly circulates. This feature adds to the operating economy by diverting into the warm air ducts heat which ordinarily is radiated into the basement by furnaces of conventional design. ★ The "Pacific" Everlast Blower Furnace is available in a wide selection of heating capacities . . . 55,000 to 550,000 B.T.U. A.G.A. approved for natural and manufactured gas. ★ Send today for our New Catalogue Folio on this the Year's Big Comfort-maker which is the ideal heating installation for apartments and public buildings as well as large residences. Address Dept. G-2.

PACIFIC GAS RADIATOR CO.
Huntington Park, California

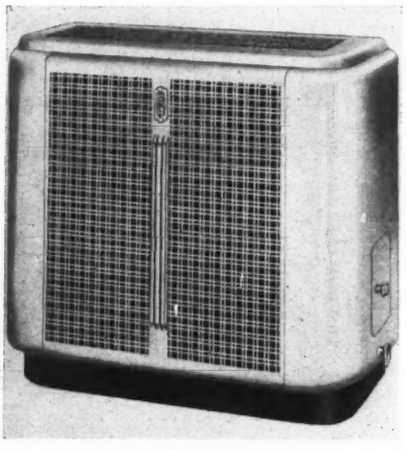


COMBUSTION CHAMBER "FINNED" FOR GREATER HEAT RADIATION AND OPERATING EFFICIENCY

Pacific

MODERN *Products*

Circulating Radiant Heater

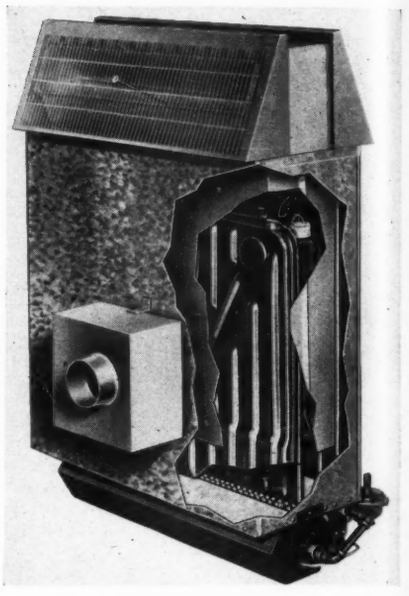


The Howle Co., Chicago, Ill.
Model: Console.
Description: Has cast iron, one-piece burner, scientifically designed so that gas is evenly distributed to all ports, giving the same uniform flame to all parts of the burner. The front perforated steel casing allows radiant heat to pass out and give direct warmth to the occupants of the room without disturbing the rising current of circulating air. Built-in down draft diverted with center of flue connection 18¼ in. from the floor. Ideal for straight connection to open fireplace. Inner heating unit is porcelain enamel inside and outside, scientifically constructed to provide the utmost in durability and efficiency. The heating unit is made of a patented crimped and sealed die edge process which insures a gas-tight, stay-tight construction. The combination of a large heating surface with a long delayed flue travel enables the inner unit to obtain maximum heat from the fuel.

■ ■

Floor Furnace

L. J. Mueller Furnace Co., Milwaukee, Wis.
Model: Flor-Aire.
Description: This unit is a self-contained recirculating type pipeless furnace, complete with dual register box and two wall grilles. The return air travels down into the furnace through the outer edge of the wall register, insulating the complete warm air stackhead—a protection against overheated walls. The specially designed burner occupies the entire space at the bottom of the heating section, providing uniform heat distribution throughout the section and using air from beneath the floor for combustion —not from the space being heated. The heating section is of baffled, ribbed design, assuring maximum heat absorption and transfer to the re-circulated air. The unit is equipped with an adjustable damper which may be operated from either room. Heat may be directed to both rooms or either room. The burner is of wind-proof design which protects against drafts or winds affecting burner flame or pilot. Operating controls are readily accessible through a small removable section of the steel grille. Standard equipment includes pressure regulator, operating key, lighter rod, manual main gas cock, manual pilot gas cock, two grilles in gray prime coat. A Baso safety shut-off is available as extra equipment. The unit is available in one size only with an A. G. A. input rating of 33,000 B.t.u.'s per hour, and an output rating of 23,100. The unit measures 46½ ins. in over-all height, and has an over-all width, including diverter, of 17½ in.



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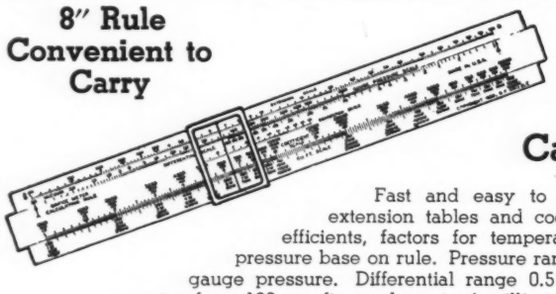
Explosion-Proof Motor

U. S. Electrical Motors, Inc., Brooklyn, N. Y.
Model: Vertical, Explosion-proof.
Description: This new unit is suitable for vertical applications in both Class I, Group D, and Class II, Group G, locations as defined by the National Board of Fire Underwriters. The first class are those locations in which flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are present. The second class includes locations in which combustible dust is present as in flour or feed mills, grain elevators, starch plants, sugar, cocoa, and coal pulverizing plants. The unit is fan-cooled and has asbestos protected windings which are especially important, as explosion-proof motors are rated 55 Centigrade rise or 37% higher than standard motors. These motors are offered with a variety of mounting flanges, and regardless of the design of the machine, a mounting bracket is available to fit it without additional adaptors or plates.

8" Rule Convenient to Carry



New Orifice Meter Calculating Rule

Fast and easy to operate. Eliminates using extension tables and coefficient tables. Orifice coefficients, factors for temperature, specific gravity and pressure base on rule. Pressure range 25" vacuum to 1000 lbs. gauge pressure. Differential range 0.5" to 100". Will figure gas rates from 100 cu. ft. per hour to 4 million cu. ft. per hour.

Indispensable to metermen and field men for quick calculation of orifice meter rates, also to figure sizes of plates necessary to measure different gas rates. Complete instructions with each rule. Natural wood finish.

Price $2.00 each, postage prepaid.

B. F. GRIZZLE P. O. Box 126 Terre Haute, Indiana

GAS—1709 W. 8th Street, Los Angeles, California

Yes! SEND ME GAS *for* 3 Years at $2.00

SUBSCRIPTION RATES: United States, Mexico and Central American countries (in advance), three years $2.00; all other countries, $3.00 per year.

Name..... Position.....
Company.....
Address.....
City..... State.....
☐ Check enclosed ☐ Send bill

Catalogs

General Controls Co., Glendale, Calif., has just published its 1941 Catalog. It consists of 48 pages and is complete with engineering description and charts, performance tables and diagrams of each item in the company's line of automatic pressure, flow and temperature controls.

In the Catalog are listed the new V-300 Gas Regulators, for low pressure installations; a new manual reset valve, the MR-1-2, for control of liquids, vapors and gases, and the complete new line of T-80 Series Thermostats.

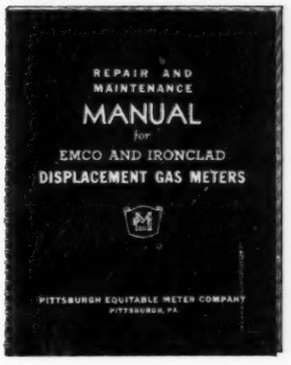
Spencer Thermostat Co., Attleboro, Mass., has issued a new catalog. Filled with illustrations, specifications and prices for room thermostats, limit controls, fan switches, duct thermostats, stoker timers, thermal time relays and other controls for heating and cooling, this thirty-two page book features many new controls as well as price revisions on various others. Of particular interest to the gas field is a new line of electric diaphragm gas valves, as well as pilot switches and other controls for automatic gas-burning equipment.

Catalog No. 41, just released by the M. B. Skinner Co., South Bend, Ind., is said to represent an entirely new venture in the field, being virtually a 40-page manual on repair clamps, service fittings, drilling methods and equipment. The catalog contains useful information, complete dimensions, installation instructions, and original data never before published. A series of valuable tables show the ten most widely used service methods, with data on equipment recommended for various sizes of tees, saddle outlets, pipe nipples and tubes.

A six-page folder on gas meter and regulator diaphragms, for manufactured, natural, and petroleum gas, is being distributed by the Vulcan Proofing Company, Brooklyn, N. Y. The folder illustrates a number of diaphragms furnished for various equipment manufacturers. The advantages claimed for these new diaphragms are illustrated and described in detail, including a side-by-side comparison of the seams in leather and non-leather diaphragm loops, the latter being vulcanized rather than stitched.

A new, heavily bound, looseleaf catalog has recently been issued by the Surface Combustion Corp., Toledo, Ohio. The booklet contains sections on oven furnaces, forging furnaces, pot and crucible furnaces, convection heaters, atmospheric and blast burners, food processing equipment, and miscellaneous. Each section gives full specifications and details regarding the company's equipment in that field. Profusely illustrated.

A publication, "Repair and Maintenance Manual for EMCO and IRONCLAD Displacement Gas Meters" has been issued by Pittsburgh Equitable Meter Company. This



manual contains 80 pages of text and illustrations. Meter repairmen will find this book invaluable, since the latest and most efficient methods of renewing the life of IRONCLAD and EMCO Cast Iron and Pressed Steel Meters are described. The text matter explains fully the use of jigs developed to simplify the reconditioning of these meters. Ways and means of adjusting and proving meters after necessary maintenance work has been completed is covered. A complete set of prover tables, showing percentages of error, as well as a table for changing percentage of error to percentage of correction, is reduced.

Worthington Pump and Machinery Corp., Harrison, N. J., has just issued two catalogs, one for single horizontal three-stage compressors and the other for single horizontal two-stage compressors. The catalogs are liberally illustrated, and contain full specifications, as well as operating data and information concerning construction of the equipment.

CONNELLY REARMS, TOO!

Connelly IRON SPONGE

The nation's vast rearmament program finds Connelly ready. Keeping pace with this terrific tempo we have greatly increased our production facilities enabling us to maintain the high standard of quality and service upon which our reputation has been built.

For more than 64 years Connelly has served the leading gas companies of the country. Today, as always, we are backing up the gas industry by continuing to be the most reliable source of supply for purification materials at lowest prices, despite rapidly rising costs, and increasing difficulties of procurement.

CONSULT CONNELLY

Let us analyze your purification problems. The experience of Connelly engineers, backed by daily contact with the industry, is at your service without obligation.

Write Us Today

CONNELLY IRON SPONGE & GOVERNOR CO.
CHICAGO, ILL. ELIZABETH, N. J.

Arkansas Western Gas Co. Buys River Valley Gas Co.

THE Arkansas Western Gas Co., Fayetteville, Ark., a natural gas company serving the Arkansas towns of Springdale, Rogers, Bentonville, Siloam Springs and Fayetteville, has completed the purchase of the River Valley Gas Co.'s physical properties, it was announced recently.

The announcement was made by L. L. Baxter of Fayetteville, vice president and operating manager of the Arkansas Western. Negotiations for the purchase have been under way for some time.

The River Valley Gas Co., with headquarters in Paris, Ark., has been the distributor of gas in Paris, Ozark, Coal Hill, Charleston, Hartman, Altus, Denning, Ratcliff, Subiaco and Caulksville, all in Arkansas.

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Refrigeration Requirements Issued for Criticism

The Subcommittee on Approval Requirements for Refrigerators Using Gas Fuel, of which W. S. Walker of the Consolidated Edison Co. of New York is chairman, recently completed revisions to standards for gas-fired refrigerators. Changes and additions agreed upon are included in recommended revisions printed and distributed to member gas companies and manufacturers of gas-fired refrigerators and others interested, on January 14, 1941, for review and criticism.

Constructional details relating to various gases are now grouped under Part I. Electrical equipment, when employed, must meet applicable provisions of the National Electrical Code approved as American Standard. Gas pressure regulators, automatic pilots, and semi-rigid gas appliance tubing and fittings when furnished are required to comply with constructional details of applicable listing standards.

Performance sections devoted to city gases have been expanded to include recommendations of the Subcommittee on Test Gases and Test Pressures which prescribe more comprehensive and rigid tests covering combustion and burner and pilot operating characteristics. Particular attention has been devoted to automatic pilots by inclusion of additional tests in line with those prescribed by the listing requirements covering continued operation tests. The section devoted to propane gas has been extended to cover liquefied petroleum gases, thus permitting approval for propane, butane, and intermediate mixtures.

All suggestions and criticisms from the industry should be addressed to R. B. Harper, chairman, A.S.A. Sectional Committee, Project Z21, A.G.A. Approval Requirements Committee, in care of the American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland, Ohio.

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Aksarben Gas Company Adding New Line

Operations now under way by the Aksarben National Gas Co., Oxford, Neb., loom as one of the most important improvements by that company in 1941, according to Ree McGee, president of the Aksarben and manager of the Kansas Pipeline and Gas Co.

Eight-inch pipe is now being placed on the ground from Scotts City, Kan., to Herndon, Neb., a distance of 100 miles. When laid, the pipe line, to be constructed by the Kansas Pipe Line & Gas Co., will connect the Hugston field with the line now leading into McCook, Neb., from the east. This, as explained by McGee, will complete a two-way circuit of supply from the fields to McCook and other communities being serviced by Aksarben. The remainder of the line will be completed sometime this summer, making a total of 850 miles of pipe line serving some 80 communities.

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Wyoming Co. to Furnish Gas For Texas Repressuring

E. H. Besse, of Kittery Oil Co., Casper, Wyo., has announced that his firm is to build a 4-in., 14-mile pipe line to handle gas for repressuring work in the Bluff Creek, Cook, and other pools of west Shackelford County, Texas. Gas for present repressuring work has been furnished by Lone Star Gas Co., Dallas.

Obituaries

Daniel Howard Snow

Daniel Howard Snow, 58 years old, and manager of the American Gas Co. in Columbus, Kans., died recently at his home in Columbus following an illness of more than two years. He formerly served with the C. E. Burlingame Corp. of Bartlesville, acting for years as their general manager of all of their property.

Mr. Snow was active in civil and social affairs, serving on the Board of Education of Carl Junction and as a loyal Mason and member of the Eastern Star.

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William Alvin Moore

William Alvin Moore, vice president and general sales manager of the Mississippi Power and Light Co., Jackson, Miss., passed away lately at the untimely age of 37.

Mr. Moore came to Mississippi in February of 1929 as industrial sales manager of the Mississippi Power and Light Co. from the General Electric Co. and played an important part in the industrial development activities of Jackson and Mississippi. In 1937, he was elected vice president and placed in charge of sales by the company's board of directors.

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Charles Baskin

Charles Baskin, construction supervisor, United Engineers & Constructors, Inc., died suddenly of a heart attack recently while engaged in that company's work at Utica, N. Y. He was 50 years of age.

Mr. Baskin joined the U. G. I. Contracting Co. in September, 1919, and remained with that organization when it became part of United Engineers & Constructors, Inc. He was active in the supervision of the construction of gas plants in all parts of the United States.

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Archibald W. Leonard

Archibald W. Leonard, 65 years of age, president of the Devonian Oil Co., died recently at his home in Tulsa, Okla., of a heart attack. Mr. Leonard was formerly vice president of the Oklahoma Natural Gas Co. and while serving in this capacity was also elected president of the Natural Gas Association of America. He was associated for many years in an advisory capacity with gas projects in Oklahoma, Kansas and Texas.

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A. C. Hacker

A. C. Hacker, vice president of the Hacker Pipe and Supply Co., Los Angeles, passed away Sunday, January 26. Formerly associated with the Grinnell Co. as manager of their Philadelphia branch, Mr. Hacker went to California in 1912, and again became associated with the Grinnell Co. as sales manager of their Los Angeles branch in 1919. He served in that position until 1931, when he went into business for himself.

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Edward A. Grens

Edward Anthony Grens, 46, vice president and treasurer of the California Pacific Utilities Co., died at his home in Millbrae Highlands, Calif., on January 2.

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